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AVIATION

The Oldest American Aeronautical Magazine

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THE FIFTH ANNUAL *National Air Tour*

Ford Motor Company AND AMERICAN AERONAUTIC DEVELOPMENT

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BOHNALITE X

36% Lighter than Aluminum
78% Lighter than Iron

Extreme lightness in metal! Here is Bohn's latest contribution to the aircraft industry.

Bohnalite X is the lightest metal on the market that is practical for aeronautical engine parts, hardware items, trimmings, etc. For this new alloy is 36% lighter than aluminum and 78% lighter than iron. Here is a weight saver in the full sense of the word.

Can be used for castings, forgings and extrusion.

Write today for complete information and physical properties.

Aircraft Division

BOHN ALUMINUM & BRASS CORP., DETROIT, MICHIGAN

New York Chicago Philadelphia Cleveland Pittsburgh

AVIATION, June 1, 1929. Vol. No. 26, No. 22. Published weekly. McGraw-Hill Publishing Company, Inc., New York, N. Y. Domestic $4.00 per year; Canada $5.00. All other countries $6.00; 20 cents a copy. Entered as second-class matter, July 27, 1928, at the post office at New York, N. Y., under the act of March 3, 1879.

JUST as the Glenn L. Martin organization pioneered in the solution of mastery of the air, it is now pledged to pioneer in perfecting new contributions to the art of aeronautics.

THE GLENN L. MARTIN CO.
Builders of Quality Aircraft since 1909
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THE GLENN L. MARTIN CO.
THE ACCOMPLISHMENT OF THE PAST IS A PROMISE OF FUTURE ACHIEVEMENT

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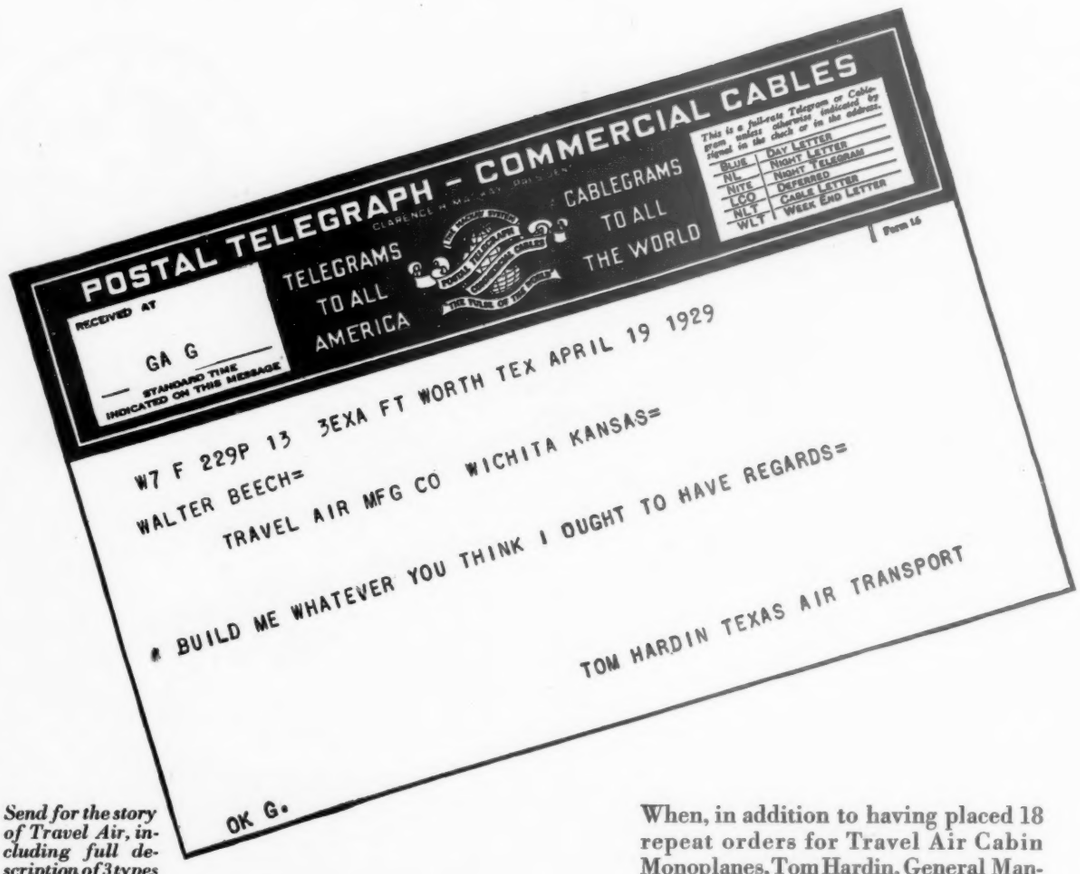
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TRAVEL AIR MFG CO WICHITA KANSAS=
BUILD ME WHATEVER YOU THINK I OUGHT TO HAVE REGARDS=
TOM HARDIN TEXAS AIR TRANSPORT
OK G.

Send for the story of Travel Air, including full description of 3 types of Cabin Monoplanes and 8 types of open cockpit Biplanes

When, in addition to having placed 18 repeat orders for Travel Air Cabin Monoplanes, Tom Hardin, General Manager, Texas Air Transport, sends this telegram relative to a Travel Air plane for his private use, there can be but one thought in his mind. Confidence! Complete confidence in the manufacturer and the product.

TRAVEL AIR COMPANY

WICHITA, KANSAS

"THE STANDARD OF AIRCRAFT COMPARISON"

QUESTIONNAIRES prove nationwide *satisfaction in* TRAVEL AIR

QUESTIONNAIRE

1. When did you purchase your Travel Air Plane?
   Feb. 14, 1927.
2. What is the Serial Number on your plane?
   159.
3. Have you always been satisfied with it?
   Plenty.
4. If so, will you please name the features that appeal to you most forcibly in this plane?
   Travel Airs stand the gaff—in Texas it must stand it or out you go.
5. If not, what have been your difficulties?
   Not enough flying to wear them out.
6. Have you any suggestions to offer?
7. Have you always received satisfactory service and shipment on parts?
   Yes, very.
8. In general, how are you satisfied with Travel Air Products, and would you buy another Travel Air if we had a model that would suit your requirements?
   It's not if you had a model that would suit my requirements, it's as soon as I can raise the money to buy one of the big monoplanes.
9. May we quote you in our advertisement?
   Sure.

Louis E. Dempsey

A short time ago Travel Air sent a Questionnaire to all Travel Air owners, now numbering over 1000. The answers are coming in rapidly. A 100% response is expected. Here are two of the replies. Others will be published in the near future.

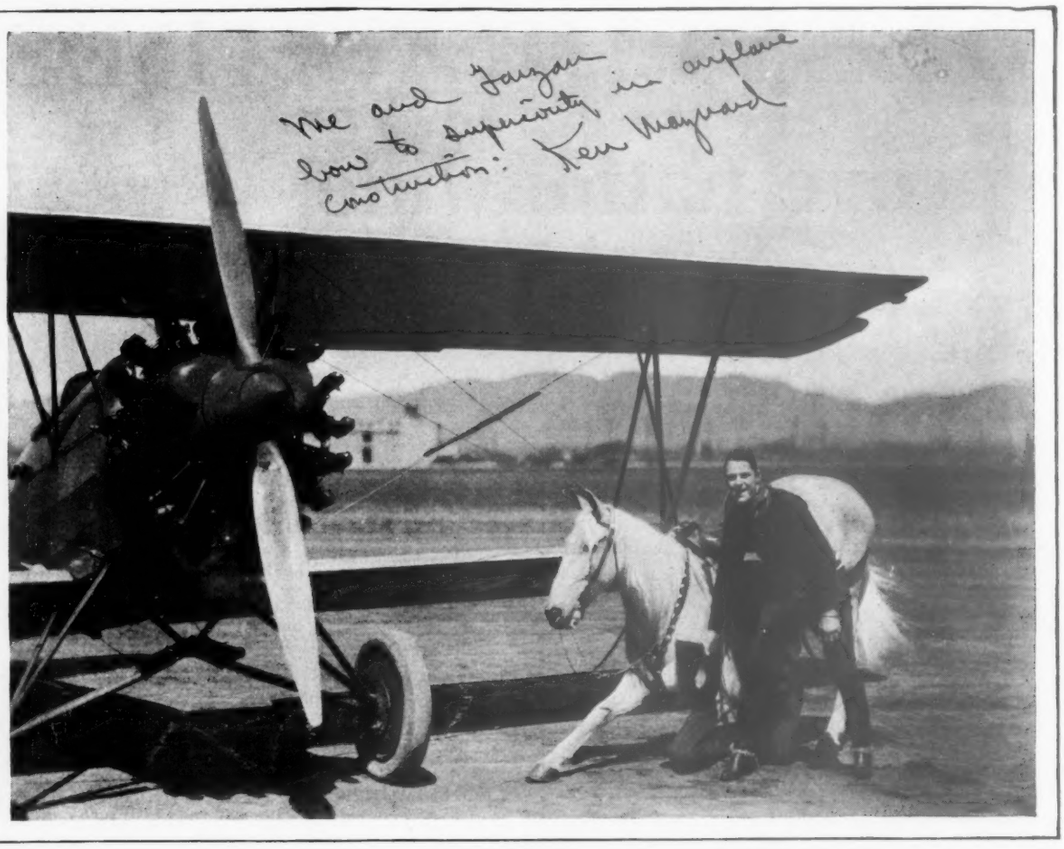
QUESTIONNAIRE

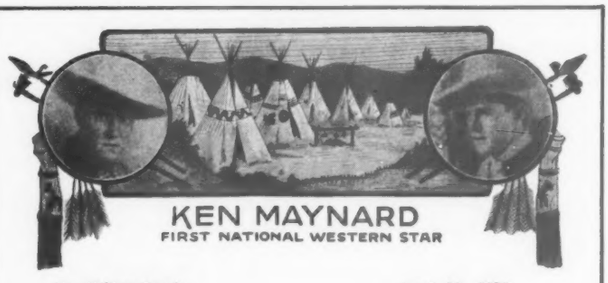
1. When did you purchase your Travel Air Plane?
   Nov. 25, 1928.
2. What is the Serial Number on your plane?
   782.
3. Have you always been satisfied with it?
   Perfectly.
4. If so, will you please name the features that appeal to you most forcibly in this plane?
   My Travel Air J5 Biplane gives a dependable security, due to its inherent stability and it being remarkably responsive to its controls.
5. If not, what have been your difficulties?
   No difficulties.
6. Have you any suggestions to offer?
   None.
7. Have you always received satisfactory service and shipment on parts?
   Splendid.
8. In general how are you satisfied with Travel Air Products, and would you buy another Travel Air if we had a model that would suit your requirements?
   Yes.
9. May we quote you in our advertisement?
   Yes.

Dean S. Dearborn
Sharpsville, Pa.
(Postmaster)

A new edition of the story of Travel Air, describing all 11 types of Travel Air planes including the new four place Cabin Monoplane, will be sent free on request.

TRAVEL AIR COMPANY · *WICHITA, KANSAS*





Mr. Walter Beech, April 20, 1929.
Wichita, Kansas.

Dear Mr. Beech:

Your letter and questionnaire received and enclosed find same. It is perhaps entirely unnecessary to say I enjoy owning one of your Planes, which I believe to be one of the really few jobs stressed for a Whirlwind Engine. Its performance is perfect and in every way I find the Travel Air a worthy airplane. Flying as I do for purely pleasure and in view of the fact that the Studio Officials objected to my sport to the utmost, I naturally wished to obtain the safest and best airplane on the market which I believe I have found. Under separate cover am mailing you some pictures you may, if you care to, use for publicity and my name at any time in connection with a Whirlwind Travel Airplane.

Thanking you for your letter and your interest in me, I am

Very truly yours,

Ken Maynard

In selecting a plane, Ken Maynard placed emphasis, above all, on dependability. It is not surprising that he chose Travel Air — nor that he has become one of Travel Air's hundreds of enthusiasts.

The new Travel Air catalog, now on the press, illustrates and describes all Travel Air models — 3 types of Cabin Monoplanes and 8 types of Biplanes — a complete line to fill every need. Free on request.

TRAVEL AIR COMPANY · *WICHITA, KANSAS*

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R S FOGG HOTEL STATLER

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THE QUICKEST, SUREST AND SAFEST WAY TO SEND MONEY IS BY TELEGRAPH OR CABLE

A few of the hundreds of satisfied owners

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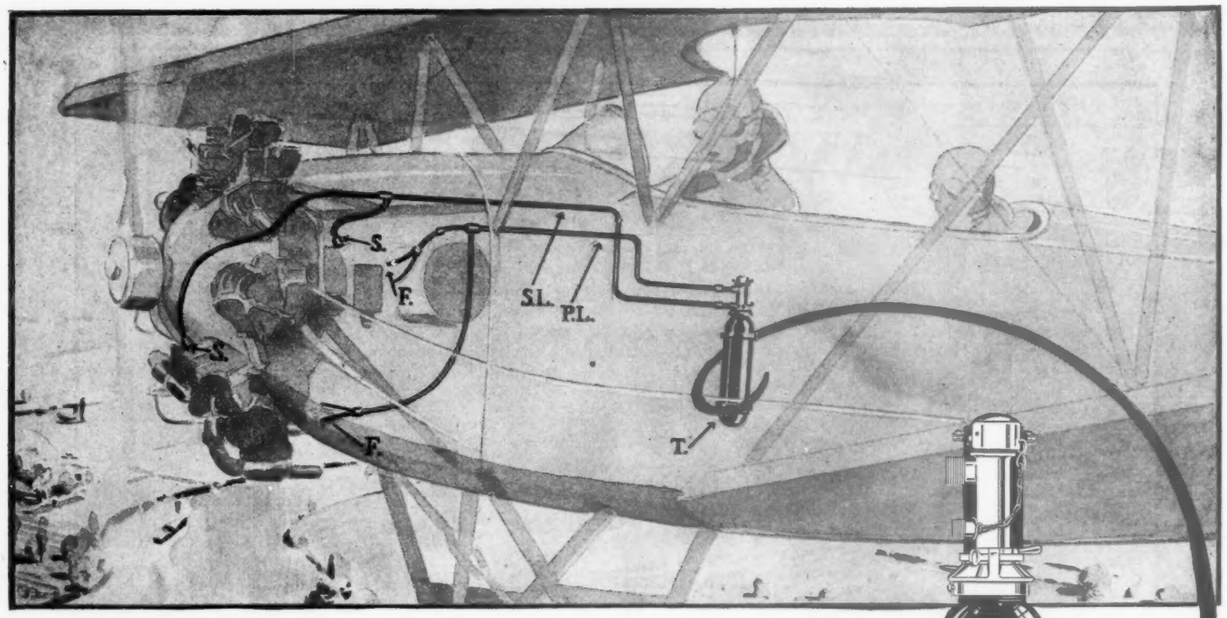
"THE STANDARD OF AIRCRAFT COMPARISON"

TRAVEL AIR COMPANY

WICHITA, KANSAS

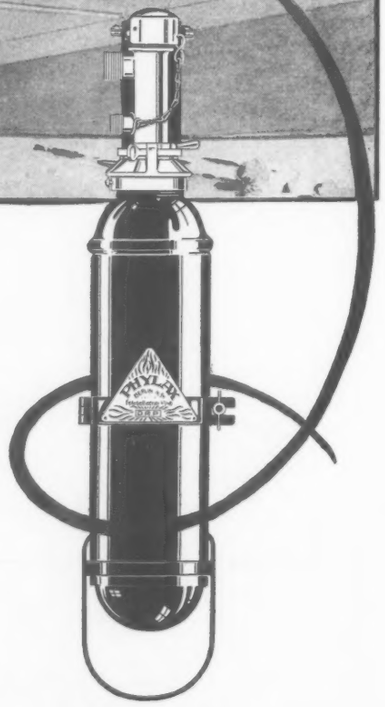


Five miles from a Fire House . . . but . . . SAFE . . .

With automatic—fool-proof PHYLAX on guard at every danger point—should fire start—it is *out in five seconds*—though the pilot may not see it, or even be aware of the fact. Under all conditions, fire in the air is under absolute mechanical control with the installation of

PHYLAX

Because the flame itself instantly releases the extinguishing element which protects every part of the plane. (*See illustration.*) Made automatic so that the pilot may give all his attention to the controls—PHYLAX can also be operated by hand or electricity. At its low price—$70 for an air-cooled engine and $80 for a water-cooled engine installation—PHYLAX is the most economical fire insurance—plus positive protection, for pilot, passenger and plane, from the deadliest danger of the air—fire! Write for full particulars.



A PHYLAX fire extinguisher installation consists of a tank (T), containing the extinguishing liquid, mounted in the pilot's cockpit. Connected to the tank (T) are two copper pipe lines—pressure line (PL) and sprinkler line (SL). At the ends of the pressure line (PL) are two or more fuses positioned where fire is most likely to originate. At the ends of the sprinkler line (SL) are one or two sprinkler heads (S) positioned to cover the strategic points of the engine—carburetor and oil sump. When any fuse (F) is attacked by fire, it automatically sets the PHYLAX system in operation.

AERO SUPPLY

MFG. CO. INC.
COLLEGE POINT · LONG ISLAND · NEW YORK

OUR CREED

EMPTY CHAIRS

IT is a costly matter to carry empty chairs on the scheduled trips of a transport plane. But there will be empty chairs so long as transport rates are unreasonably high—and there will be high rates so long as there are high operating costs.

The short life and the unusually high expense of maintaining equipment have, in the past, contributed heavily to the cost of operating air lines, and have materially decreased their earning power. Now, however, it is possible by means of the Allmetal Flamingo to introduce low air-rates and to increase earnings appreciably.

The flying costs of the Allmetal Flamingo are the lowest per passenger mile of any transport plane in its class in America today, because:

The long life of the metal used in its construction has been thoroughly demonstrated. Depreciation of the plane is a negligible item.

Maintenance, also, is reduced to a minimum because there is no need for annual plane overhauls; no re-covering nor doping necessary; no warped wings or control surfaces to re-align; no rigging to true up.

The engines used are of proven ability. They will economically carry heavy loads at high speeds.

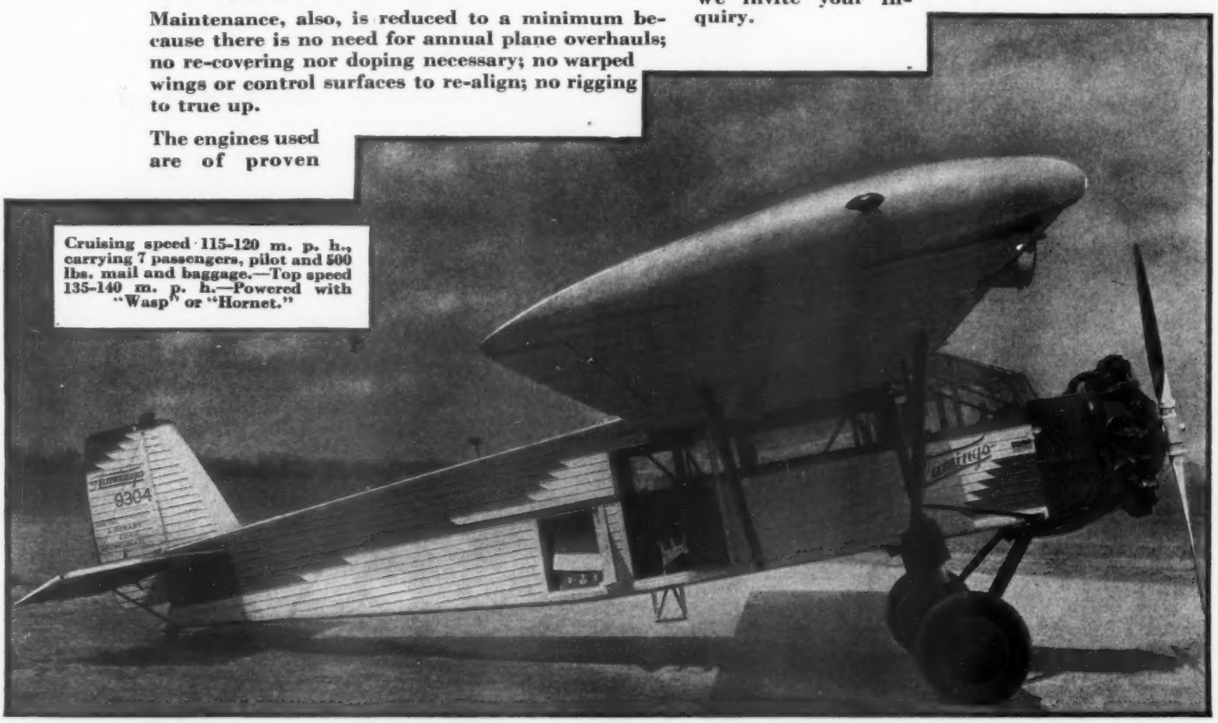
The carrying capacity of 7 passengers, pilot and 500 lbs. of mail and baggage is definitely proved by European air travel figures to be the most economical capacity for day-in day-out traffic demands—even where rates are comparable with rail rates.

The initial cost of the Allmetal Flamingo is practically the same as that of wood and fabric planes of equal capacity.

To these unique characteristics of the Flamingo are added special considerations for the safety and comfort of passengers—unusual flying ease for the pilot—features that are realized in a manner not found in other transport planes.

The best insurance against empty chairs—and the best assurance of increased earnings, are to be found in the Flamingo.

We invite your inquiry.



Cruising speed 115-120 m. p. h., carrying 7 passengers, pilot and 500 lbs. mail and baggage.—Top speed 135-140 m. p. h.—Powered with "Wasp" or "Hornet."

ALLMETAL
FLAMINGO

The METAL AIRCRAFT CORP.
CINCINNATI

BLAW-KNOX Galvanized STEEL HANGERS are the result of specialized engineering research to determine the most economical type of hanger construction to fill all requirements of airport or landing field.

Over twenty years experience in the construction of Standard Steel Buildings has resulted in Hangers which are—

1. Made from stock units, easily erected, enlarged, changed in shape or moved as occasion requires.
2. Firesafe.
3. Weathertight and easily heated.
4. Furnished with any type of swinging, sliding, or folding doors.
5. Low in first cost and extremely low in maintenance.

Send for fully descriptive literature.

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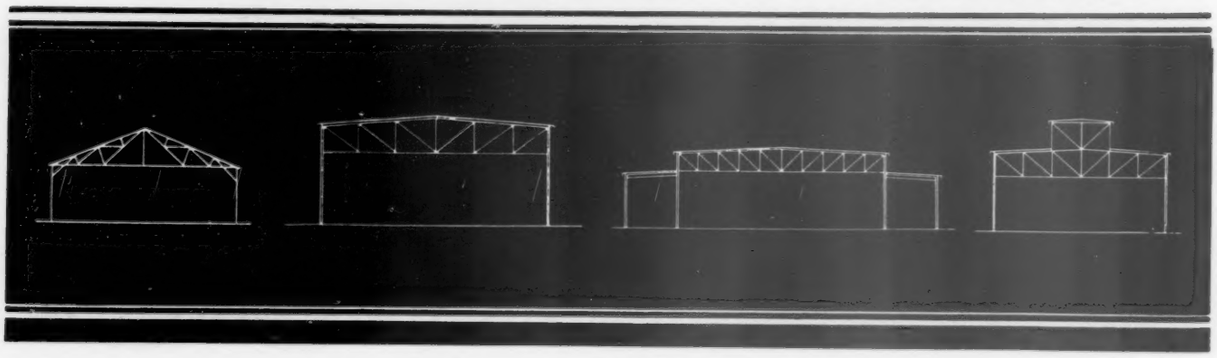
Offices and Representatives in All Principal Cities

AND AUXILIARY BUILDINGS FOR THE AIRPORT



THANK YOU *for mentioning* AVIATION

THE · BERRYLOID · FLEET · NUMBER · FOUR

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Travel Air &

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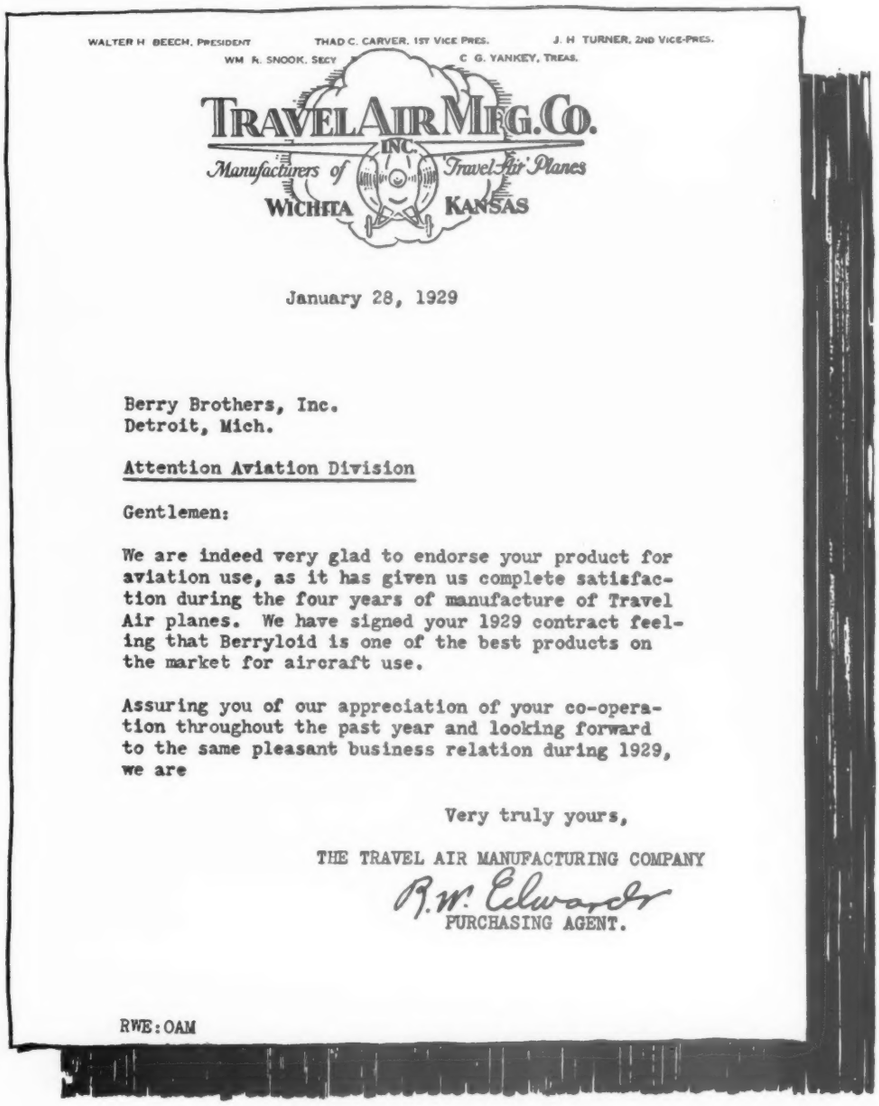
AIRCRAFT FINISHES

International Orange, Travel Air Blue and Vesta Yellow—the colors of the brilliant Macaw, suggested the combination on this Travel Air

MEMBER · AERONAUTICAL · CHAMBER · OF · COMMERCE

TRAVEL AIR *renews* BERRYLOID CONTRACT



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TRAVEL AIR MFG. CO. INC.
Manufacturers of Travel Air Planes
WICHITA KANSAS

January 28, 1929

Berry Brothers, Inc.
Detroit, Mich.

Attention Aviation Division

Gentlemen:

We are indeed very glad to endorse your product for aviation use, as it has given us complete satisfaction during the four years of manufacture of Travel Air planes. We have signed your 1929 contract feeling that Berryloid is one of the best products on the market for aircraft use.

Assuring you of our appreciation of your co-operation throughout the past year and looking forward to the same pleasant business relation during 1929, we are

Very truly yours,

THE TRAVEL AIR MANUFACTURING COMPANY

R. W. Edwards
PURCHASING AGENT.

RWE:OAM

TRAVEL AIR WAS PRECEDED IN THIS SERIES BY STINSON, FOKKER, AND BUHL.

Many airplane manufacturers contract with Berry Brothers for their entire finishing requirements. Travel Air has renewed its agreement for 1929, expressing complete satisfaction with quality of materials and the service rendered. Every Travel Air, beginning with number one, has been finished from spinner to rudder with Berryloid.

PROGRESSIVE · AIRCRAFT · FINISHES

BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan — *Walkerville, Ont.*

"HEADQUARTERS FOR EVERYTHING IN AVIATION"

DEALER TALKS

No. 2

DEALER: "That's the beauty of this Curtiss Flying Service organization—no matter what you need in the way of aircraft Curtiss can supply it."

PROSPECT: "A plane for every purpose, eh?"

DEALER: "Exactly—now that you're going to be operating in the Wisconsin lake region, this Ireland amphibion just fits your requirements."

PROSPECT: "I've heard that Curtiss is going to operate a nation-wide system of service stations—is that true?"

DEALER: "Yes—and it's a mighty important step. It means that you can get with your plane the same sort of service you have come to expect with your automobile."

PROSPECT: "Sounds good to me. I'd like to fly that Ireland if you could arrange it."

DEALER: "Certainly. There's Captain Ervin now, he's our New England manager. I'll introduce you and we can arrange a demonstration immediately."

PROSPECT: "Fine! You fellows certainly work in close harmony."

DEALER: "You bet we do; and it means a lot to all of us."

CURTISS
FLYING SERVICE

AIRCRAFT
SALES AND SERVICE

AERIAL TRANSPORTATION

AERIAL
PHOTOGRAPHIC SURVEYS

AGRICULTURAL DUSTING

FLYING SCHOOLS

CURTISS FLYING SERVICE

"—WORLD'S OLDEST FLYING ORGANIZATION"

Sole Sales Agents for

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CESSNA AIRCRAFT CO.
SIKORSKY AVIATION CORPORATION
CURTISS AEROPLANE AND MOTOR CO., INCORPORATED
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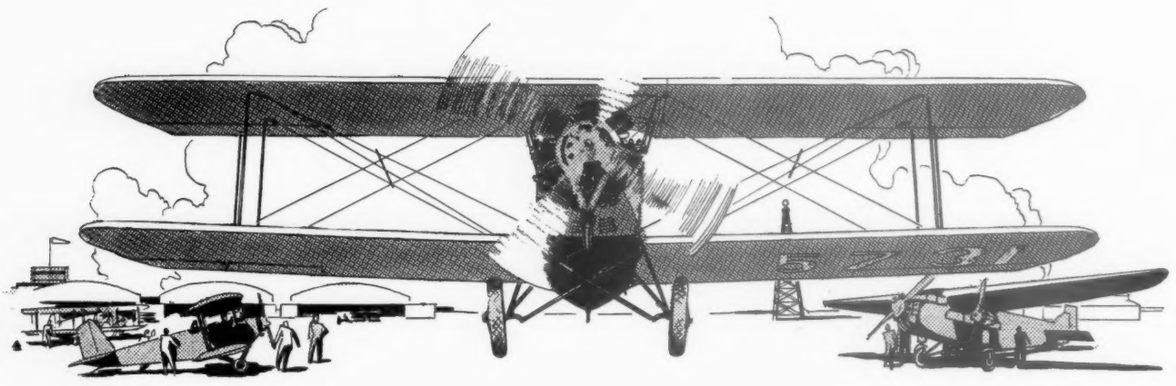
27 West 57th Street, New York City

THANK YOU *for mentioning* AVIATION

Thorough training is the background ▲ ▲ ▲



# of every polished pilot

New Planes—Spartan Training planes powered only with nine-cylinder, radial, air-cooled motors, are used exclusively in the Spartan School of Aeronautics. Planes and motors are inspected regularly by Government-licensed mechanics.

Army Instructors—The Spartan School instruction staff consists entirely of mature men holding transport pilot (the highest grade) government licenses, chosen because of desirable Army background and ability to impart knowledge to others.

Accommodations—Attractive student quarters fifty yards from the airport are maintained by the Spartan School at cost. Furnished rooms, reading rooms, showers and garage, meals at the airport dining room. An ideal arrangement for students.

A Great Airport—Tulsa's 400-acre municipal airport is the Spartan School training field. It has been laid out in accordance with modern, accepted airport requirements and is recognized as one of America's foremost municipal airport projects.

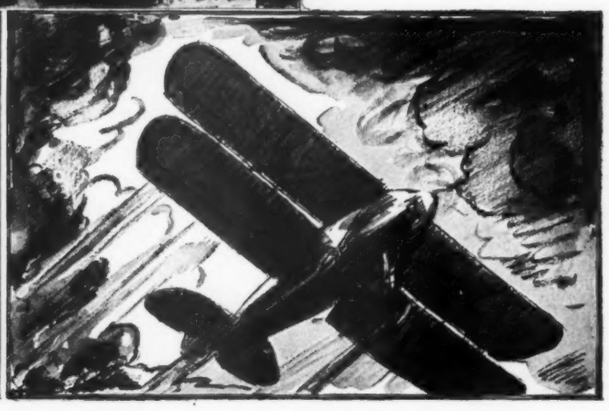
Factory Facilities—Spartan School students have access to the Spartan factory for information of importance to the progress of their actual flying. In the factory, students may study aerodynamics and airplane structure in its various stages.

Write for full particulars

Aviation Center—Four airports and a government meteorology station are factors involved in Tulsa's importance as an aviation center. Three passenger carrying lines, one using tri-motor Fords, and the air mail, operate from the Municipal Airport.

SPARTAN SCHOOL OF AERONAUTICS

Municipal Airport ◆ Tulsa, Oklahoma



LABORATORY, TEST BLOCK AND FLIGHT

-TP- Aero Valve Spring Lubricant

For Valves, Springs, and Valve Guides. Stays on—Does not burn or carbonize. Send 50c for ½ pint trial can.

-TP- Aero Rocker Arm Lubricant

A pure, paraffine-base, low-cold-test, mineral-oil lubricant. Free flowing—will not carbonize. Send 50c for 1-pint trial can.

BY every test -TP- Aero Motor Lubricating Oil plainly demonstrates its superiority. It represents a great stride ahead in the science of lubrication. -TP- eliminates many causes of engine trouble—reduces the risks of flying.

-TP- Aero Motor Lubricating Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

A handsome, practical *Pilot's Log Book* sent free on request. Please use the coupon.

TEXAS PACIFIC COAL AND OIL COMPANY
FORT WORTH, TEXAS
New York St. Louis Los Angeles

-TP- AERO MOTOR LUBRICATING OIL

PATENT PENDING

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Texas Pacific Coal and Oil Company, Fort Worth, Texas
Please send me, without obligation, your Pilot's Log Book.

Name_____ Address_____

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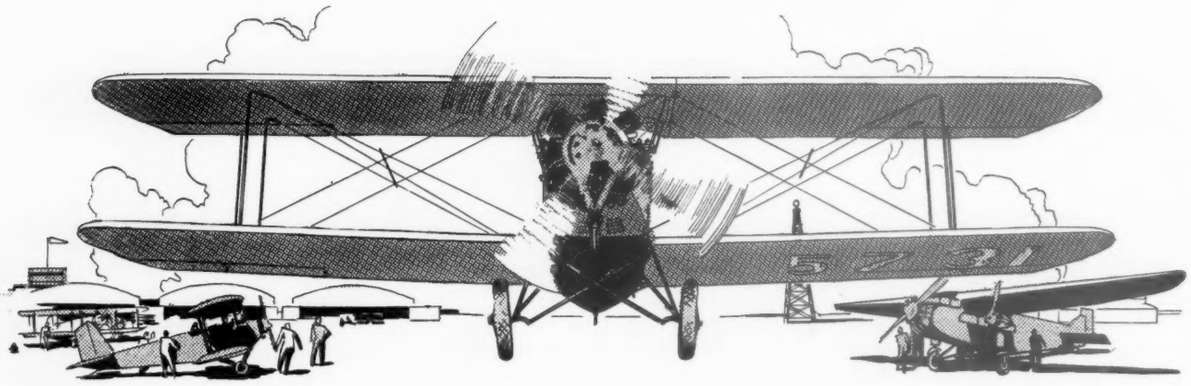
Thorough training is the background ▲ ▲ ▲



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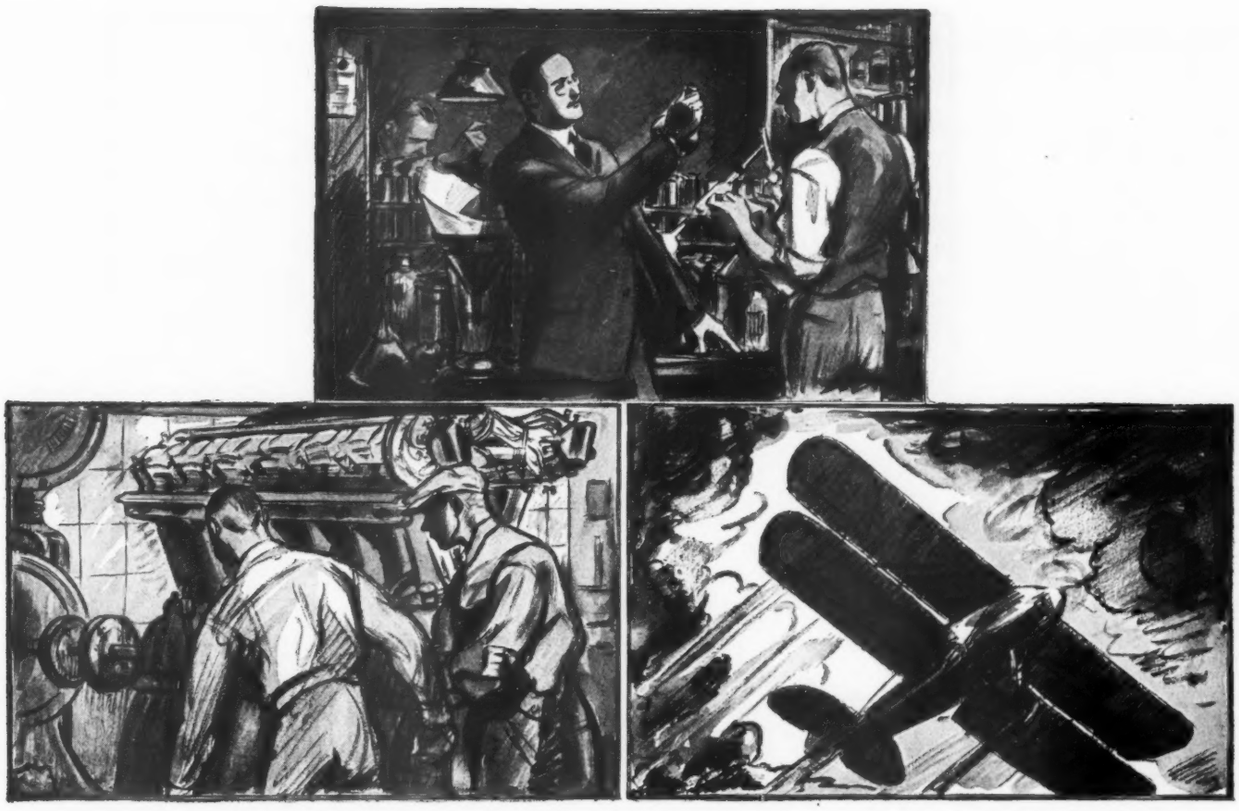
Municipal Airport ◆ Tulsa, Oklahoma



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For Valves, Springs, and Valve Guides. Stays on—Does not burn or carbonize. Send 50c for ½ pint trial can.

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A handsome, practical *Pilot's Log Book* sent free on request. Please use the coupon.

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-TP- AERO MOTOR LUBRICATING OIL

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Texas Pacific Coal and Oil Company, Fort Worth, Texas
Please send me, without obligation, your Pilot's Log Book.

Name_____ Address_____

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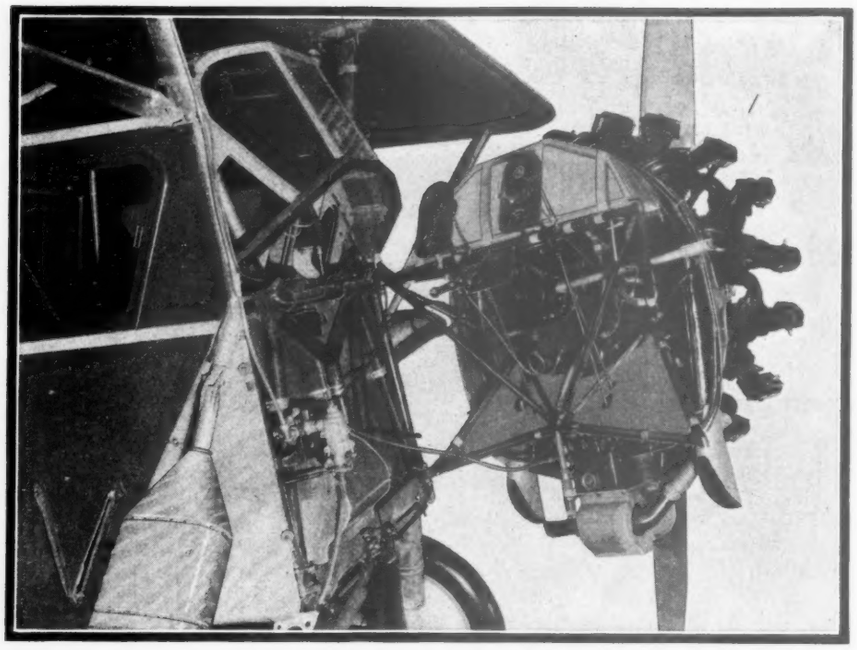

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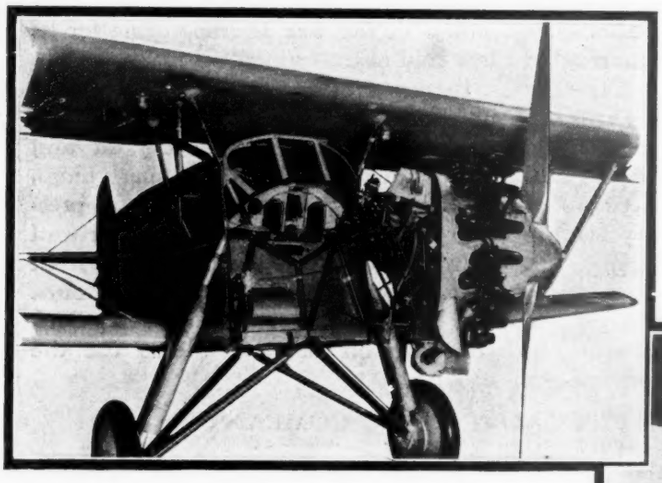
TYPICAL of the many features which make for economical operation with Knoll aircraft is the engine mounting of the KN-1. The entire power plant — engine control, instruments and every engine accessory — is demountable as a unit. Loosen the cowling, disconnect the gas line, remove two bolts and the power plant swings out — perfectly accessible on every side. A complete new power plant unit can be installed in less than 30 minutes. The only connection broken is the gas line. The advantage of instruments, lubrication lines, engine accessories, controls, etc., installed and adjusted to the engine in the shop is obvious to the experienced operator.



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For those interested in site selection, preliminary survey and report, complete airport, hangar or other buildings, airplane or accessory manufacturing plant, it will be well worth while to get in touch with Austin. Phone the nearest office, wire or send the memo.

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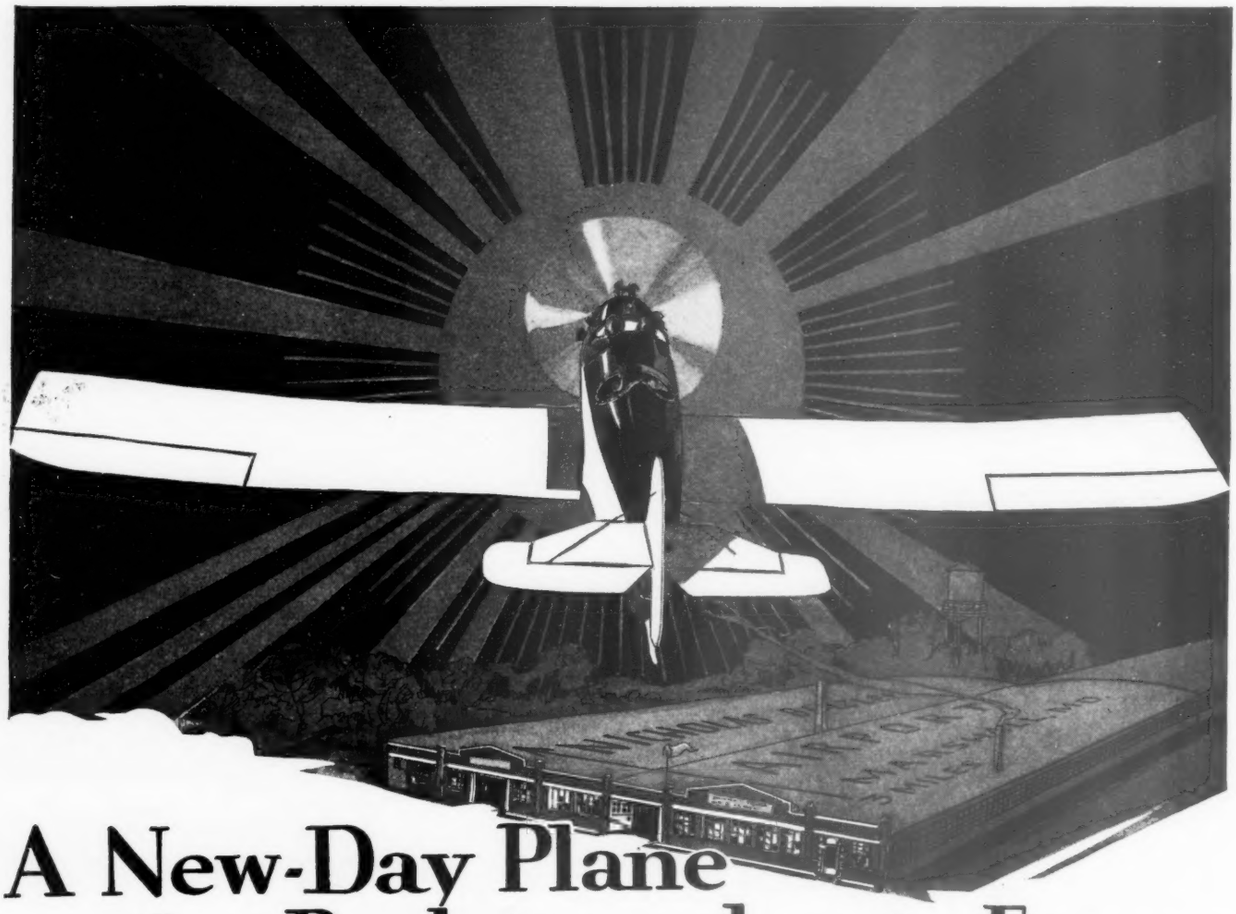
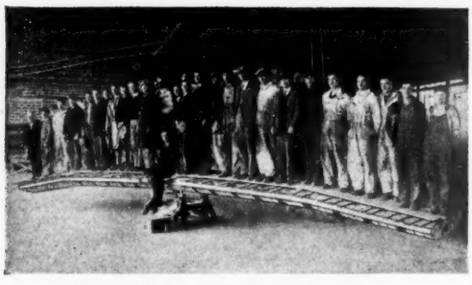


A New-Day Plane *with a* Background *and a* Future



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This photograph of thirty-eight men standing on the Barling NB3 patented wing gives some idea of the great strength *engineered* into the wing. Six and one-half times the total weight of the ship has been successfully applied to the wing —without any indication of weakness.

The New-Day Barling NB3 takes off from a background of established stability. Its manufacturers, the Nicholas-Beazley Airplane Co., Inc. are not adventurers in the field of aeronautics. This firm, already America's foremost aviation supply house, enters the manufacturing division with experience—valuable in both the production and marketing of this New-Day Plane.

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Amazingly low in price, this all-metal structured, three place, low-wing monoplane, completely equipped, is only $3600—fly away Marshall.

Successfully established dealers may still obtain franchises in a few desirable territories.

NICHOLAS-BEAZLEY AIRPLANE COMPANY, Inc.
Manufacturing Division Marshall, Missouri

BARLING NB 3 Monoplane

Vacuum Oil Company . . . *presents*

A new "double range" Mobiloil made especially for today's high-speed, heavy-duty aircraft engines

The Vacuum Oil Company celebrates a quarter century of leadership in the air with a new contribution to the science of aviation — Gargoyle Mobiloil Aero H.

The rapid development of commercial aviation has placed an added burden upon lubrication. With characteristic foresight Mobiloil engineers have been working to perfect an oil especially adapted to the new requirements of today's high-speed, heavy-duty aircraft engines. Their efforts have met with remarkable success.

Mobiloil Aero H possesses certain definite advantages over other oils now in general use for airplane engines:

1. "Double range"—body and stamina under severe heat and load conditions combined with easy starting and exceptional fluidity at low temperatures.
2. Less carbon deposit.
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These facts about the new Mobiloil Aero H are based upon conclusive tests conducted by leading aircraft engine builders in the United States and abroad.

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Makers of high-quality lubricants for all types of machinery

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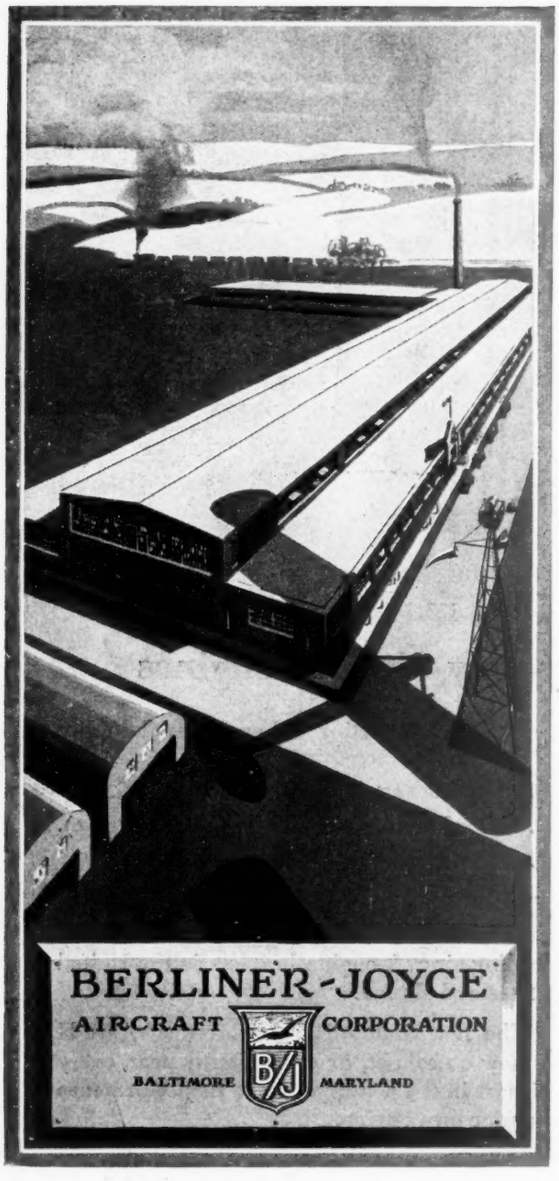
THANK YOU *for mentioning* AVIATION

Expect Great Things

of The New B/J



EXPECT great things—and well you may. To design and build a plane that will set the flying standards of tomorrow, B/J has drawn together a group of men whose genius has contributed much to the standards of today. To name a few of them—

TEMPLE N. JOYCE, internationally known as Army test pilot during the War, later Washington representative for Curtiss, then sales manager for Chance-Vought;

WILLIAM H. MILLER, designer of the wind tunnels at Massachusetts Institute of Technology, later in charge of Curtiss research laboratory;

EARL P. OSBORN, formerly stress analyst, then in charge of propeller department, then chief of Curtiss structural section;

HAROLD A. BACKUS, formerly chief metallurgist and general engineering consultant on materials, processes and finishes for Curtiss.

THOMAS E. PELL, formerly factory superintendent of the Naval Aircraft Factory at Philadelphia;

HENRY A. BERLINER, designer and builder of the Berliner helicopter and monoplane, and President of the absorbed Berliner Aircraft Company;

Designed and built by a balanced staff of technicians such as these, you may, indeed, expect great things of the new B/J. It is clearly destined to become "*The Pacemaker of the Air.*"

COMING events cast their shadows before—and there is coming not only the new B/J Plane but the new B/J dealer plan and advertising, establishing for B/J Planes a pacemaking position in the consciousness of airminded Americans. Built in a new quarter-million dollar plant (*pictured above*) with every facility for high-quality, low-cost production, B/J Planes will be "Pacemakers of the Air" in saleability as well as in performance. Write to G. Roger Coats, Commerical Sales Manager, Berliner-Joyce Aircraft Corporation, Baltimore, Md., for advance information about the B/J dealer franchise.

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The Oldest American Aeronautical Magazine

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CONTENTS

June 1, 1929

VOLUME 26 . . . NUMBER 22

Editorials 1869

Ford Motor Company and American Aeronautic Development 1870

Fifth Annual National Air Tour 1874

The Problem of Rubbish in the Airplane Factory 1876

High Temperature Liquid Cooling 1877

The First National Airport Convention .. 1879

The Cunningham-Hall PT-6 Cabin Biplane 1881

News Sections 1883

The Buyer's Log Book 1897

Side Slips 1898

Index to Advertisers 1954

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NEW YORK Dist. Office, 285 Madison Ave.
WASHINGTON, National Press Building
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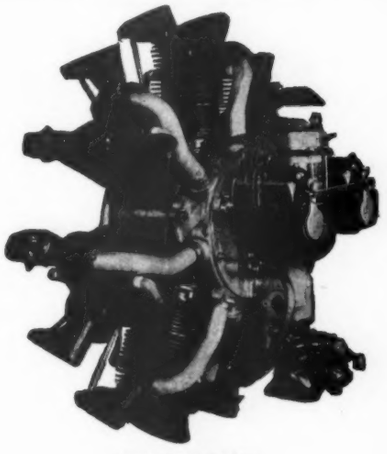

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

June 1, 1929

VOLUME 26 . . . NUMBER 22

One National Show

A NATIONAL AERONAUTICAL EXHIBITION is a rather exhausting affair to the visitor and exhibitor alike, but to the latter it is also very expensive. Every aircraft show, such as the one held recently in Detroit, must cost the industry close to a quarter of a million dollars. However, the effort and the cost are really well worth while, for the same results can not be accomplished as quickly, effectively, or as cheaply in any other way.

On the other hand, the benefits to the industry to be derived from national shows diminish rapidly in accordance with the number of shows held during the course of a year. That being so, it would not seem practical, nor profitable to hold more than one national show a year, particularly now that the manufacturers are concentrating on yearly models. There can be only one "first showing" of a plane, and that should be at the one big national show which would be attended by the entire aeronautical clan. And in addition, it is believed that the national show should not be held in the same city each year. Every big city should have a chance to hold the national show, if for no other reason than the stimulating of public interest in aeronautics in that particular section of the country.

//

Production and Progress

ONE OF the greatest problems now facing the aircraft industry is that of suitable methods for standardizing production. It is impossible to build good aircraft economically so that they may be readily serviced in the field, unless the manufacturer employs costly production jigs and special tools. At the same time it is apparent that once a manufacturer has thoroughly equipped his factory for the production of one model he will not welcome improvements in the plane which would necessitate junking his expensive special equipment. Thus an honest effort to build better planes inevitably acts as a bar to progress in the improvement of existing types.

It is evident that the aircraft industry needs production engineers, at the present stage of development, more than it needs aeronautic engineers. Men who can design satisfactory production tools and jigs which will at the same time be susceptible to changes in the airplane and be adaptable to such changes at a low cost, are badly needed. Such engineers must be developed, for through their efforts alone can aircraft building be placed on a par with other great industrial efforts.

//

Illumination of Instruments

A SAVING of $2.50 that eventually led to a repair bill of $2,500 seems almost incredible. Yet it is vouched for by a private plane owner who flies for both business and pleasure

When he bought his plane it was with the intention of using it only in day flying and always landing before dark. Consequently he could see no need of paying for radium or luminous dials on his instruments and thereby saved about $2.50. All went well until he was overtaken by darkness much earlier than he expected, on his way home and where he thought he knew the country perfectly. Things look differently, however, in rapidly growing darkness and he became lost as his compass was not illuminated and he finally made a forced landing that almost wiped out the plane.

As the result of cases of this kind certain makers now refuse to sell instruments without luminous dials. Even when bought for training planes to be used only over a local field, there is no insurance that they may not at some time be transferred to another plane. They also recommend a rheostat in the lighting circuit of illuminated instrument boards so the pilot can adjust the illumination to suit his vision. With the light changes between daylight and dark, the eye does not always accommodate itself rapidly enough to maintain vision with only the luminous dials, and full illumination may be needed during the dusk or twilight period. As the darkness increases the illumination can be reduced until the luminous dials show plainly without aid from the lighting system.

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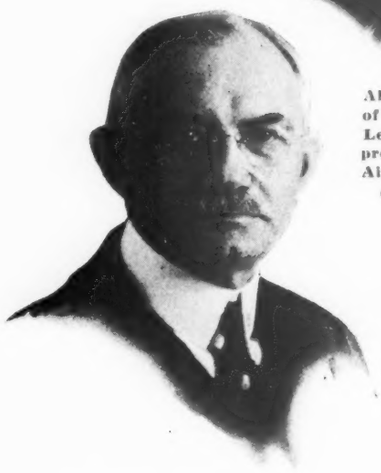
Ford Motor Company

By JOHN T. NEVILL

PROBABLY no single event, except for the entry of the government into the air mail field, bore more significance to this country's aircraft industry up to 1925 than did Henry Ford's dignified notice published in the Ford *News*, Aug. 8, 1925, that his company had launched into the airplane manufacturing business.

That information, coming to light in complete accord with the typical Ford manner, was interpreted by laymen over the nation to mean that perhaps "there was something to this aviation thing, after all." The layman's thought was based upon his knowledge of Ford's business judgment and the proven ability of Mr. Ford not only to see a hidden market for a given product, but to foresee the possibility of, and create a market for that product.



Above: Henry Ford, president of Ford Motor Company. Left: William B. Mayo, vice-president of The Stout Metal Airplane Company, Division of Ford Motor Company

And it may safely be stated that those already within America's aircraft industry, such as it was at that time, welcomed the Ford Motor Company into their ranks, viewing the announcement as a spur to ultimate realization of their dreams, if not as a definite turning point toward the financial health of the industry.

It would be an injustice to those pioneers in American aviation—the Curtiss company, the Wright company, the Packard company, and several others—even to surmise that they would have hesitated to stick at their posts and fight their way through to the bright era enjoyed today. Yet, that being as it may, there can be little doubt that the interest of the Ford Motor Company has encouraged other capital and greatly accelerated progress of the industry toward the happy condition existing at the present time.

A man of considerable aeronautical prominence, visiting Detroit not long ago, remarked that "a visit to Ford Airport is a large part of an education in commercial aviation." That remark was well put. When a visitor sets foot on Ford Airport today he sees one of the largest, most modern, and most completely equipped commercial airports in the United States—this on property that less than five years ago was tree covered and unused. He sees more than 600 acres of level turf, with runways 2,800 ft. in one direction and 2,600 ft. in another, a large part of which runways are concrete. He sees a row of ultra-modern airport buildings, conveniently located on the entrance side of the field, large and spacious, but dwarfed by the remarkable expanse of the field. He views an up-to-the-minute airplane factory, where materials are brought in at one end and one of the world's finest airplanes wheeled out at the other.

Today's visitor to Ford Airport sees two large hangars, one of them being 123 ft. wide and 300 ft. long, containing a number of the world's best known history-writing airplanes. On the field is one of the most modern dirigible mooring masts in the country, towering 208 ft. into the air, yet representing virtually no hazard to use of the field. He sees airplanes taking off and landing almost hourly, operating on regular schedule with passengers, mail and express. He observes a splendid passenger terminal building, said to be one of the finest airport passenger stations in the United States, serving aerial passengers such as the railway station serves the railroad traveller. Atop the main hanger he inspects a United States Government weather station probing constantly into the status of the upper air, the highways over which the port's planes operate. He enters a radio building and hears other airports tapping their weather reports and messages into Dearborn. There he views a huge electric motor, transmitter, code machine and intricacies of the radio beacon, equipment having been proven capable of guiding a properly equipped aircraft, hundreds of miles distant, on a bee-line to Ford Airport.

At night he witnesses a system of illumination second to none in the nation, guiding airmen to the airport, showing them the exact boundaries of the field, and creating artificial daylight over the ground itself, that the aviator might bring his craft down in absolute safety.

Despite the few years of its existence Ford Airport has been the scene of a number of memorable milestones in aviation progress. Here, it was, that Henry and Edsel Ford began America's first regular inter-company

AND AMERICAN AERONAUTIC DEVELOPMENT

It is altogether probable that very few members of the industry have ever stopped to consider the tremendously important part that the Ford Motor Company has played in the development of American aeronautics. And fewer still have stopped to realize that the Company's active interest dates as far back as the period of the World War. In a series of articles, of which this is the first, Mr. Nevill presents a most interesting detailed and graphic picture of Ford aviation progress from its beginning up to the present time.

airplane mail and express line. Here was inaugurated the second successful domestic contract air mail route to go into operation. Here was erected the first privately owned dirigible mooring mast in the United States. And here was demonstrated publicly that an airplane could be navigated from one point to another and distant point and return, solely by the use of radio.

IN THE PAST few paragraphs we have described in a sketchy sort of way the Ford airplane picture as it is today. Meanwhile, a question arises that, for purposes of this series of articles, might better be answered soon. Just why and how did the Fords enter aviation?

Henry Ford has given his son, Edsel, full credit for being the first of the two to interest himself in commercial aviation. This, probably, is as it should be, since Edsel Ford was one of those "sportsmen" who contributed money to William Bushnell Stout, when that versatile gentleman came to Detroit with what was then a fantastic scheme to build commercial airplanes.

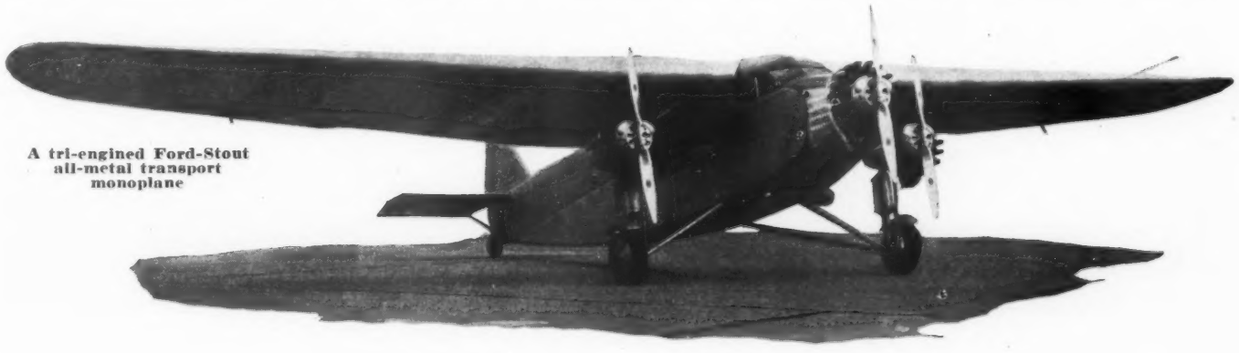
However, to answer the question, why and how did the Fords get into aviation, it will be best to slide back a few years and introduce a small group of men who introduced aviation to Detroit.

As a matter of record Detroit's initial aviation activity was brought there by the same group credited with bringing the Packard Motor Car Company to Detroit. Henry B. Joy, son of one of the men responsible for the Michigan Central Railroad; Fred M. Alger, son of General Russell A. Alger, Secretary of War during the Spanish-American War, and a number of equally influential associates brought the Packard Motor Car Company to Detroit from Warren, Ohio, in 1903, the same year the Wright brothers made the world's first airplane flight.

Henry B. Joy, a man who has a penchant for experimenting with new ideas, happened to be on an automobile tour, such as automobile tours were in those days, when he heard that the Wrights had made their flight. He left the tour and hurried to Kitty Hawk. A short time later Mr. Joy became one of the few men having the distinction of having flown with one of the Wright brothers.

In 1910, Mr. Joy, the two Alger brothers, Fred M. and Russell, and a number of friends interested with them in the Packard Motor Car Company, attempted to pursuade the Wrights to locate in Detroit, but they were unsuccessful. The Algers then purchased a Wright plane and took it to Detroit, giving that city its first view of an airplane.

A few months later, in 1911, the same group of men organized the Aero Club of Detroit, the first such club in the state of Michigan, and an organization now long out of existence. The plane, piloted by a man named Frank Coffyn, made the first flight across Lake St. Clair,



A tri-engined Ford-Stout all-metal transport monoplane

a flight regarded as extremely hazardous in those days. Fred Alger rode with Coffyn on that occasion. Coffyn and Russell Alger a few days later started from Gaukler's Point, on Lake St. Clair, where the Aero Club was located, and negotiated the first flight from the United States to Canada.

Only a few years later, after the start of the World War, Mr. Joy was one of the first men in Detroit to realize that aviation would be called upon to play a large part in that struggle. With this idea in mind he utilized the facilities of Packard Motor Car Company to construct an airplane engine, experiments on which later formed a considerable part of the foundation of the famous Liberty motor. Many Detroiters still recall with a smile the novel way in which these early engines were tested. They were mounted upon a large Packard truck, with the propeller projecting over the truck's rear end. The engine of the truck was shut off and the airplane engine started. With only the propeller furnishing motive power, the truck was driven about the streets.

In the meantime, Mr. Joy, feeling that a flying field in the vicinity of Detroit should be provided, made a survey at his own expense and selected a site near Mount Clemens, Mich. He purchased the property and developed it into a flying field. In 1917, at the request of the Government, represented by Howard E. Coffin, of Detroit, now chairman of the Board of National Air Transport, Joy Field, by which name it was called, was enlarged and sold to the Government at cost. Joy Field became Selfridge Field, in honor of Lieut. Thomas Selfridge, the first United States Army officer to die in an airplane crash.

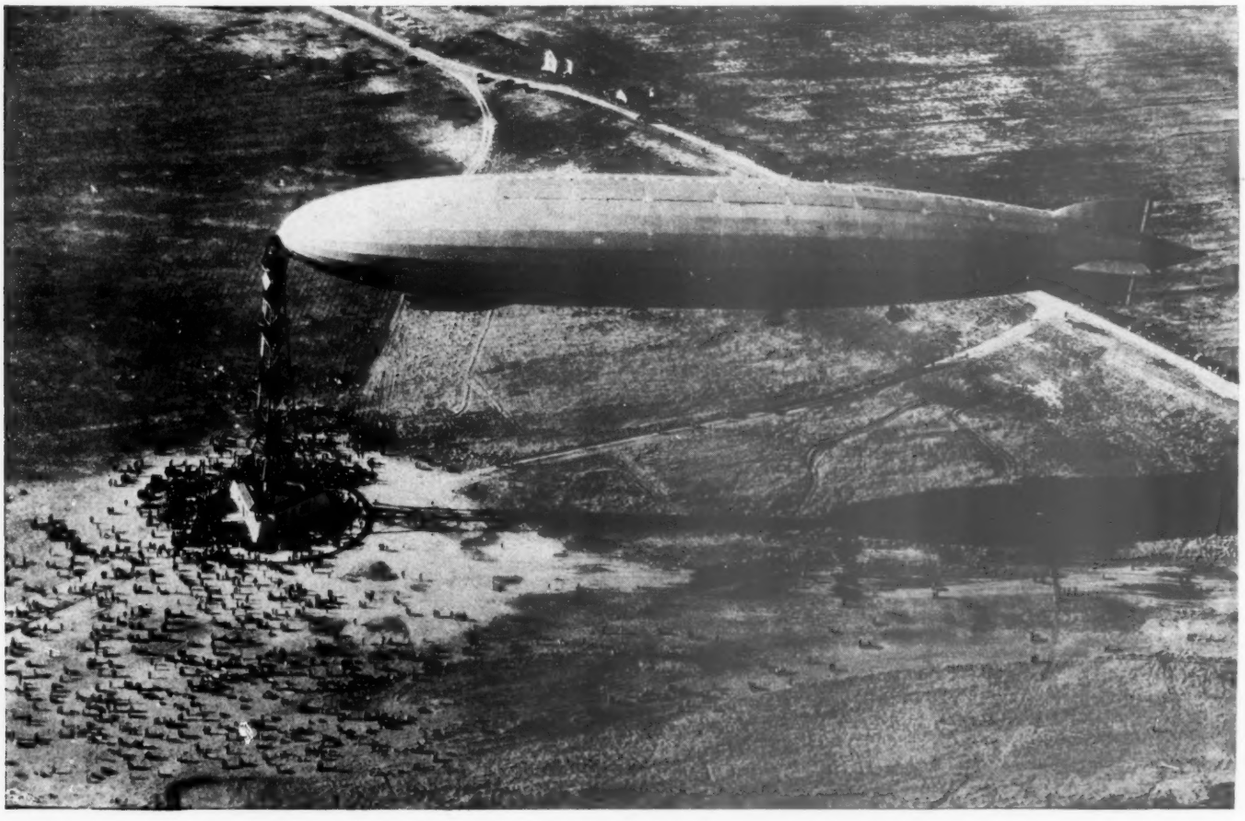
Next came the Government's Aircraft Production Board, organized in Washington, to help put the American army into the air. Due to long neglect on the part of the Army officials the United States had very little to boast of in the line of aeronautics. The Board was created to direct American manufacturers in the production of aircraft material, and included in its membership such men as Howard E. Coffin, Maj. Gen. George O. Squier, head of the Signal Corps, U. S. Army; and Col. E. A. Deeds, head of the aircraft production division, U. S. Army. Mr. Coffin was chairman of the Board.

Since the United States had not as yet produced any planes or engines that would be of any service at the Front the situation facing the Aircraft Board was an exceedingly difficult one. This country had no samples of European planes or of European engines. Furthermore, we had no designs of those products by which to be guided. So a commission composed of two army engineers, two naval engineers, and two civilian engineers, was sent overseas to inspect the Allied craft and engines.

MEANWHILE the Packard Company offered the Government designs of the aircraft engine with which the company had been experimenting, but they were found too heavy for the horsepower developed. Col. J. G. Vincent, chief engineer of the Packard Company; Colonel Deeds, Col. Sidney D. Waldon, assistant to Colonel Deeds; and Col. E. J. Hall, of the Hall-Scott Motor Company, of Berkeley, Calif., then evolved the design for an American airplane engine, the Liberty.

The Packard Motor Car Company constructed the first Liberty, an eight cylinder engine, within six weeks. This engine successfully passed the government tests, and steps were taken to use every available facility to produce them in large quantities.

The next step was to organize a large group of manu-



The U. S. S. "Los Angeles" riding at the mooring mast on the Ford Airport, Dearborn, Mich.

facturers willing to curtail their respective commercial production and devote their plants to building airplanes and engines for Uncle Sam. The Liberty engine was but one of seven different types of engines to be produced, the commission sent abroad having returned with designs of several foreign engines. Engines to be built were the Liberty, the Hispano-Suizza, the Bugatti, the Hall-Scott, the Gnome rotary, the Le Rhone rotary, and the Curtiss. In short, the job at hand was to build 101,657 engines to cost $4,460,000.

It was a large order and made considerably larger by the fact that the work had to be done with the utmost rush. To Harold H. Emmons, a Detroit attorney, serving his country in the Navy, fell the arduous duty of taking charge of this engine production. Mr. Emmons, later given the rank of colonel in the Army, was the only naval officer assigned to the Army during the World War.

Colonel Emmons quickly assembled his organization, 23 engine building factories, including,

besides the Packard Motor Car Company, the Ford Motor Company, the General Motors Corporation, the Lincoln Motor Company, the Buick Motor Company, the Marmon Motor Car Company, the Franklin Motor Company, the Pierce-Arrow Motor Company, the Cadillac Motor Car Company, the Duesenberg Motor Corporation, the Curtiss Airplane Company, the Wright-Martin Aircraft Corporation, and many others.

Hardly had the engineering and tooling work on the eight cylinder Liberty been completed and initial production begun, than word was received from the Front that the eight cylinder Liberty would be of no use there. It must be made into a 12 cylinder engine. Colonel Emmons organization of engine builders received this message with a spirit to be highly commended, and immediately began work on the larger engine.

The work done by these companies needs no detailing here. It is suffice to say that before the Armistice, more than 30,000 of these seven types of engines had been produced, the Libertys, on which type the Detroit area concentrated, totalled 15,000. Today, nearly 11 years later, many of them are still in use throughout the world.

It might be pointed out, however, that, since Detroit's position as the automobile center of the country has never been disputed, it can safely be taken for granted that the vast bulk of the aviation work done for the Government during the War, took place within the Detroit area.

Above Reading left to right, William B. Mayo, William B. Stout, Edsel Ford, Henry Ford and Pilot E. G. Hamilton standing besides a Ford-Stout all-metal monoplane

Left: An air view of the Ford Airport, Dearborn, Mich.

Colonel Emmons, himself, in fact, is authority for the statement that more than seventy-five per cent of all aviation material produced during the World War was built in and around Detroit.

The reader, perhaps, will begin to wonder just what most of the foregoing paragraphs have to do with the question, Why and how did the Fords get into aviation? Those paragraphs were written, first, to bring out the fact that Henry Ford was substantially engaged in the manufacture of war-time airplane engines prior to his entry in the commercial airplane field, and, second, to disclose the frame of mind, or the "air-mindedness," of a certain group of influential Detroiters whose efforts later enlisted the aid, first of Edsel, then of Henry Ford.

In the trying period shortly following the War believers in aviation were called upon to re-sell the idea of aviation to the public—this time in a commercial sense. Airplane factories not blessed with Government contracts could not very well exist. War-time pilots became "gypsy fliers," flying here and there about the country, eking out an uncertain living by furnishing "joy hops" to a few adventurous persons. Some of the few aero clubs and flying schools existing before the war were re-organized, and many more such clubs began to spring up about the country.

One or two annual competitive air meets were inaugurated. The Pulitzers of New York started the Pulitzer races in 1920. The Detroit group, instrumental in organizing the National Aeronautical Association, under whose rules the air meets were operated, suceeded in bringing the Pulitzer races to Detroit in 1922.

Several years prior to this, however, the efforts of a man around whose activities the Ford airplane division was moulded, came into recognized being. That man was William B. Stout.

The second of this series of articles by Mr. Nevill will appear in an early issue of AVIATION.—Ed.

THE FIFTH ANNUAL *National Air Tour*

John P. Wood, winner of the 1928 National Air Tour

WEARING a "brand new suit," i.e., a new committee, new manager, new referee, new route, and several very interesting alterations in the rules, the Fifth Annual National Air Tour is scheduled to go forth from Ford Airport, Detroit, October 5, on a 16-day flight through Canada, the Northeast, East, Southeast, and Northwest, before returning to Detroit on October 21.

Although the start is still quite far in the future, plans for this year's event—recognized as one of America's premier commercial airplane classics—already have gained sufficient impetus to mark it as a virtually certain success. Despite any unpleasantries that might have arisen out of the past tours, interest in the coming tour is well founded upon the contributions made by the by-gone events to the aviation industry.

At this writing, first proofs on the revised rules for the 1929 tour are off the press, and the complete regulations have been scheduled to be in the hands of prospective entrants within the next few days, approximately four and one-half months prior to the tour start. Incidentally, the particular accomplishment of placing the rules before the manufacturers and pilots so far in advance is in compliance with one of the major requests made by the pilot-entrants after last year's event.

Although no definite information is available at this time as to the number of manufacturers who have signified their intention of competing, Capt. Ray Collins of the Union Trust Company, Detroit, who has been the tour referee during the past four years, and has been appointed as the new tour manager, states that the committee has nothing to fret over on that score. A tentative route, approximately 4,400 mi. long and covering at least 28 cities in 20 states and two Canadian provinces, has been selected. This route will take the participants from the Ford Airport to Walker Airport at Windsor, Ont., probably the shortest jump of the tour. Then come Toronto, Ottawa and Montreal, Canada, and Portland, Me., followed by Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Baltimore, Md.; Richmond, Va.; Charlotte, N. C.; Greenville, S. C.; Savannah, Ga.; Jacksonville, Fla.; Macon, and Atlanta, Ga.; Nashville, Tenn.; Louisville, Ky.; St. Louis and Kansas City, Mo.; Des Moines, Ia.; St. Paul, Minn.; Wausau, and Milwaukee, Wis.; Moline and Chicago, Ill., and Kalamazoo, Mich. The above route, Captain Collins said, is called "tentative," although with the possible addition of several cities, it is practically certain to be the route flown.

One of the most drastic changes in the rules and regulations this year is the fact that "flying advertisements," or "billboard" planes, have been barred from competition for the usual awards made to National Air Tour participants. These awards are the Edsel B. Ford Airplane Reliability Trophy and more than $12,000 in cash prizes. Billboard planes, however, have been invited to fly the tour as a sort of second contingent, taking off an hour or more behind the competing planes.

With reference to this change, Captain Collins has this to say: "The primary purpose of the National Air Tour, as we see it, is to provide direct performance competition between airplane manufacturers, and not to sell groceries, candy, radios, or the products of any industry other than that of aviation. Therefore we have decided that, although the entry may be owned by either the manufacturer or an individual, it may bear no markings other than the name of the plane, the company manufacturing it, the name of the pilot, and, of course, the Department of Commerce license. 'Billboard' planes are being asked to join us on the tour, and we will be glad to have them, but they will be required to take off an hour or two behind us, and must pay all of their own expenses. Some sort of special prizes will be competed for by the second contingent."

RELATIVE to expenses, it might be said here, that Manager Collins and the new tour committee have made some pleasing reductions in the appropriations asked from cities visited over the route. Cities where overnight stops are made this year will be asked to contribute $1,000 in cash to provide gas and oil for competing planes, and to provide hotel accommodations for one pilot and one mechanic from each entry. The sum of $500 is required of cities listed as noon-day stops.

The first alteration listed in the rules for 1929 is an all-important one. It demands the acquisition of Approved Type Certificates issued by the United States Department of Commerce and does away with "letters

of credit" and other credentials that have sufficed in the past. Under the new order of things the manufacturer must have the A.T.C. covering his entry not later than October 1—five days before the start. In 1930, it is contemplated to increase that time to 30 days in advance of the tour start, Manager Collins stated.

The next major change we note in the rules concerns the method of scoring. Whereas, last year the rules employed the planes' maximum speed in the scoring formula, then permitted an average speed on each individual lap of 80 per cent of the maximum, while giving credit for the maximum, the rules committee this year has increased the speed that must be averaged on each lap to 85 per cent of the maximum used in the formula. This concession was originally incorporated in the rules "to discourage racing and its attendant dangers," but last year the 80 per cent average "proved entirely too easy," Captain Collins stated, hence the increase.

Pursuant to a loud complaint voiced by competing pilots last year that the important part played by the "stick," and "unstick" components of the scoring formula proved unfair to planes not equipped with brakes, the rules committee has changed the formula to include only one-half the stick. Therefore, the current formula will read as follows:

"Maximum Department of Commerce useful load multiplied by the maximum speed, divided by one-half stick plus unstick multiplied by 50 divided by cubic inch piston displacement equals the figure of merit, or score for one leg," or—

$$\frac{\textit{Max. D. of C. Useful Load} \times \textit{Max. Speed}}{\textit{One-Half Stick plus Unstick}} \times \frac{50}{\textit{Disp.}} = \textit{Merit}$$

As was done last year, the stick and unstick and speed tests will be made at Ford Airport previous to the tour, and the scores for each leg will be added up following completion of each lap.

Midnight of Thursday, September 5 has been set as the final date on which manufacturers may enter planes in the tour, and there will be no delayed entries. That particular portion of rule No. 16, dealing with provisions for delayed entries, has been eliminated entirely.

Another change noted is in rule No. 28, which has to do with the provisions for delayed starts of the entire group from any of the several control points over the route. In the case of inclement weather, or any other reason that might be deemed sufficient to delay the start, the manager and referee, under this year's rules shall decide the matter, without conferring with all of the pilots, as has been the case heretofore.

It is interesting to observe that the rule providing for use of a lower cubic inch displacement figure than that actually existing and that used in the scoring formula, provided in the past several years for entrants of multi-engined planes on the condition their planes could attain given performances, is left intact. This particular rule, No. 39, aroused some complaint last year from pilots of single engined craft on the basis that it gave the multi-engined entries an unfair advantage.

ONE EXTREMELY important addition to the rules is that no work will be permitted on competing planes luring the night at the night stops. All such planes will be placed under guard immediately after re-fueling upon arrival at the night stopping point. The entrant will be allowed two hours before starting time the following morning in which to make any necessary mechanical adjustments or repairs. If the work should require a longer period than two-hours one allowed prior to the scheduled time of departure, the contestant shall lose all points on the succeeding leg of the route.

A list of passengers will be required 30 days before the start of the tour, and any substitutions must be made five days prior to the start.

During previous years the National Air Tour has been sponsored by the Detroit Board of Commerce, and has been under the general management of a tour committee appointed by the Board. This year the tour was initiated by Ford Motor Company, and has been taken over by a new committee, headed by William B. Mayo, chief engineer of the Ford organization. Although including several of the old committee members, the 1929 list embraces many new names. Besides Mr. Mayo, the tour committee is as follows: Eugene W. Lewis, vice-chairman; William E. Metzger, Col. Edward V. Rickenbacker, C. S. Mott, Frank W. Blair, Dwight Douglas, Charles T. Bush, Carl H. Keller, Ross Judson, Thomas B. Colby, Warren Packard, Newton Skillman, Norman B. Conger, Edward S. Evans, and William F. V. Neumann. Other names are to be added later, according to Captain Collins.

The tour rules committee is composed of Captain Collins, Capt. L. M. Woolson, Alfred V. Verville, Capt. Frank M. Hawks, and Robert E. Lees, of Troy, O. Captain Hawks, holder of the present trans-continental non-stop flight record, will be tour referee.

A view of some of the entrants in the first Ford Reliability Tour, which was held from Sept. 28 to Oct. 3, 1925. Seventeen planes started and 15 finished

THE PROBLEM OF *Rubbish* IN THE AIRPLANE FACTORY

By Willis Parker

A FEW MONTHS AGO, I chanced to meet and talk with a man who had the "concession" for hauling away the waste products from a large airplane factory in one of the central states. He explained that he received no pay from the company for his work, but that he netted $60 a week from his job which required but two days out of each week. For the privilege of hauling away the trash, he paid the factory superintendent $15 a week. Before proceeding with his load to the city dump, this fellow explained that he sorted the trash and saved all of the aluminum scraps, bits of copper and brass and other scraps of metal which he sold to junk dealers and averaged $75 a week from the sales.

While we do not mean to intimate that there was anything wrong from this system, we do feel that there were wonderful possibilities for leakages through connivance between the trash hauler and employees of the airplane factory. If there was no such conspiracy, the profit this man made from two days' work is sufficient to indicate that the airplane manufacturer should include in his organization ,a salvage department.

A western airplane manufacturing concern has its salvaging operations well organized and controlled—controlled to such a point that practically everything except the bark of an engine is saved.

From empty carbide cans, discarded from the welding department, have been constructed waste and salvage cans. The waste cans are painted white and have the word "Trash" lettered on the sides in red.

These cans are set up at convenient places in the factory so that the workers may assist in the sorting operations—drop waste materials into the waste cans and materials that might be used in other ways or which might be sold at a profit, into the salvage cans and assist the janitors accomplish their tasks with less effort.

IT IS A RULE, in the plant, that the floors must be kept clean and free from scraps of materials because heaps of scraps scattered here and there not only are unsightly but provide a hazard to life and property. But it isn't advisable to permit the janitors to sweep promiscuously around the plant during the day time because it interferes somewhat with the workers.

The metal workers take a few minutes out at intervals during the day to sweep up the litter under their benches and machines and deposit it in cans provided for the purpose. The sheet metal workers drop their small scraps of material into cans. Then the cans are removed every night and dumped according to the contents and value.

This removal is accomplished by litter carriers working on trolley lines—the overhead trolleys used to convey various sub-assemblies of aircraft from one place to another in the factory and to the smaller factory units located at a distance from the main plant.

Special litter carriers have been constructed from empty 50 gal. oil drums—another salvaging operation. The cans are laid on their sides and a portion of the side cut out. Then they are swung by rods at the ends, and just off center, to flanged wheels that operate on the overhead track. To prevent premature dumping, a forked, or notched, strap of iron is hinged to one end of the drum and hooks over an upright rod. When it is desired to dump the contents of the litter carrier, as it is called, the strap is lifted and the drum rolls over.

The overhead tracks reach into every department of the plant, making it possible to dump the trash and salvage cans into the litter carriers without having to carry them more than a few feet.

OUTSIDE of the plant are three wagons drawn up in a row. One of them is to receive plain trash, another metal scraps, and a third wood scraps. The litter carriers are dumped into these wagons, which, when filled are hauled off—the trash to the dump, the wood scraps to the boiler room, or to the lumber pile, from whence it is sold as kindling wood at $3.50 a ton F.O.B. the pile. The metal scrap is collected near the railroad spur and when sufficient has accumulated it is loaded onto cars and sold to junk dealers at the market price.

Iron and steel shavings have not been profitable to save, according to the factory and ground supervisor, because of their bulk, so they have, for the most part, been considered as plain trash and so disposed.

There is a possibility of considerable loss in the welding department in the discarding of short lengths of welding metal. In this plant, all lengths above 4 inches are saved and welded together to make long strips which are easy to handle in the welding processes.

Salvaging operations even enter the first aid activities, inasmuch as efforts are made to prevent waste of medical and surgical materials. The large first aid boxes usually contain materials in large quantities. When a large bottle of disinfectant is opened to treat a small scratch or cut, it will deteriorate within a short time. Hence large units are being replaced by several small units, and a saving results.

HIGH TEMPERATURE *Liquid Cooling*

The D-12 powered P-1B Pursuit plane showing size of radiator. Mr. Frank is standing in front of the plane

By GERHARDT W. FRANK

Associate Mechanical Engineer, Material Division, U. S. Army Air Corps, Wright Field

THE EVOLUTION of aircraft engines to their present state has been through a long series of developments to reduce their weight and increase their efficiency with ever greater reliability. Each pound weight removed from the engine means an equal reduction in the total weight of the airplane which increases the useful load by exactly the same amount. Also any means whereby the efficiency of an aircraft engine is increased by obtaining an increase in horsepower output from an engine of the same weight, with the same amount of gasoline, increases the final efficiency of the airplane.

The gradual reduction in weight of an engine has been accomplished by the use of stronger and lighter alloys in the constituent parts and reducing their size to the minimum allowable for strength and durability to insure safe operation through newer design as shown by the results of development and endurance tests.

The increase in efficiency has been slowly brought to its present state by improvements and advances in the operation of an engine such as developments and improvements in carburetors and manifolds, ignition systems and spark plugs, the use of higher compression ratios and superchargers and other means too numerous to mention. Another method whereby the efficiency of an internal combustion engine is increased is by operating it at a higher temperature.

The water cooled type of aircraft engines have, as the name implies, always been cooled by water. The cooling being accomplished by circulating the water through a jacket about the cylinders and then cooling the water by means of a radiator through which a blast of air is passed at high velocity. Now, as everyone knows, water boils at 212 deg. F. —a fact which definitely sets a maximum operating temperature. A satisfactory temperature for engine operation is usually considered as 180 deg. F. This allows a workable margin below the boiling point of the water. However, 180 deg. F. is much lower than the temperature desired to obtain the greatest efficiency.

Internal combustion engine engineers have been striving to find a satisfactory liquid which had a much higher boiling point than water to replace water as a cooling medium and permit the engine to operate at a higher temperature. Many different liquids such as mineral oil, kerosene, salt solutions, glycerine and other compounds have been tried but all have failed. Some are highly inflammable, some corrode the inside of the metals and deteriorate the rubber hose in the cooling system. Other liquids, in addition to the disadvantages mentioned, have a very low specific heat, which is the ability to take the heat from the cylinder and give it up again at the radiator. In fact, every one previously tried has had some very serious disadvantage which prohibited its use.

The engineers of the Power Plant Branch of the Materiel Division, U. S. Army Air Corps have recently developed in the laboratory at Wright Field an almost ideal system of cooling the water cooled type of engines. This development has been the result of a number of

years of intensive research which has culminated in the successful operation of the system.

The liquid used in the newly developed system is ethylene-glycol. This liquid has a boiling point of 388 deg. F. in the pure state and has all of the properties required of a cooling liquid, which are—relatively high specific heat, excellent wetting qualities and is non-injurious to metals. Also it is manufactured commercially and is comparatively cheap. Ethylene-glycol is the simplest of the polyhydric alcohols and is known chemically by the following symbol: CH_2OH. CH_2OH. It is a clear colorless, odorless liquid and has a slightly sweetish taste. It is being used extensively by the automotive industry as an anti-freeze. Since it has been known for fifty years it is not a newly discovered liquid, but its use in connection with high temperature cooling is a new development.

Since ethylene-glycol has a boiling point of 388 deg. F. it permits operating the water cooled type of engine at a higher temperature than ever before possible. The temperature found most suitable at which to operate the engine is 300 deg. F. This temperature gives an amply safe margin below the boiling point of the liquid. Also it eliminates the possibility of the formation of so-called vapor pockets in the cooling system which produce local areas of extremely high temperatures in the engine.

When operating an aircraft engine at a cooling liquid outlet temperature of 300 deg. F. it has been found that several highly desirable advantage are gained.

1. The amount of cooling area or size of radiator necessary is greatly reduced.
2. A reduced amount of liquid is required in the cooling system.
3. A considerable reduction in weight of the installed power plant due to the reduction in size of the radiator and the lesser amount of cooling liquid required.
4. The parasite resistance of the airplane is reduced also due to the reduction in size of the radiator.
5. It also permits the engine combustion chamber walls and cylinder barrels to operate at temperatures comparable to those in an air cooled engine with the added advantage of uniform cooling.

The radiator required to cool an aircraft engine when using ethylene-glycol as a cooling liquid and operating at the high temperature is approximately one-fourth the size of the radiator required to cool the same engine producing the same horsepower as when using water as a cooling liquid and operating at the normal temperature. The normal operating temperature of the water cooled engine is 180 deg. F. while with the new system the ethylene-glycol is operated at 300 deg. F.

The great reduction in radiator size is the result of operating the liquid at the high temperature which permits more efficient cooling at the radiator, due to the much greater temperature difference between the radiator and the cooling air. In the case of the ordinary water cooled system operating at 180 deg. F. with 60 deg. F. air temperature the difference is 120 deg. F. With the new system operating at 300 deg. F., and the same air temperature, the difference is 240 deg. F. or twice as great. Therefore, in both cases practically the same amount of heat is picked up by the liquid from the engine and only 25 per cent of the radiating area is required to cool the engine operating at the high temperature.

As previously stated the amount of liquid required is less than that in a water cooled system. This is due to the reduced capacity of the radiator and the shorter length of connecting pipes required. In the modern pursuit airplane the cooling system has a capacity of 14.5 gal. of water. With the high temperature system this is reduced to 8.5 gal. which is a reduction of 6 gal. or 41 per cent.

The resulting reduction in size of the radiator and capacity of cooling system gives a considerable saving in weight. In an actual installation of this system the airplane weighs 3.5 per cent. less than when equipped with a water cooled system.

Standard Curtiss Pursuit P-1 B with underslung radiator

The resulting reduction in size of the radiator has the most important advantage of decreasing the parasite resistance of an airplane which permits an increase in speed, with exactly the same amount of horsepower. Normally the radiator offers approximately 15 per cent. of the total parasite resistance of a pursuit type of airplane. Reducing the frontal area of the radiator 75 per cent. reduces the total parasite resistance of the airplane by about 12 per cent. The foregoing applied to airplanes equipped with the conventional type of radiator.

In the circulating system required for using ethylene-glycol as the cooling liquid and to operate at high temperatures very little change is required in certain types of ordinary water cooled aircraft engines. The changes necessary are few and should not increase the cost of the engine. The ethylene-glycol does not attack the metals in the engine and, therefore, no special provisions need be made for this purpose.

The operation of an airplane engine at 300 deg. F. is normal. There was practically no increase in wear or deterioration of the engine parts detected after a fifty-hour endurance test at the high temperature than when using water and operating at a temperature of 180 deg. F.

The Curtiss P-1 B pursuit type of airplane, illustrated, is an example of an application of high temperature cooling with a reduced conventional tubular honeycomb type of radiator. A view of the same type of airplane equipped with the orthodox water cooling system is also given for comparison of the relative frontal areas and cleanness of nose.

The Curtiss P-1 B airplane equipped with high temperature cooling in a Curtiss D-12-E engine has been given extensive flight tests. The greater part of the time it has been flown at full power engine operation at 2,300 r.p.m. The engine operation and cooling have been excellent and there has not been the slightest evidence of any trouble or disadvantage. The maneuverability of the airplane has been excellent as attested by all pilots who have flown it. The rate of climb has been increased and the airplane dives at a greatly increased speed.

THE FIRST NATIONAL *Airport Conference*

By CHARLES H. GALE

THIS AIRPORT BUSINESS is not as simple as it looks. Its deep and far-reaching ramifications are becoming more and more apparent and to none is this more obvious than the man who is devoting himself directly to airport design, construction and operation. So impressed have these men become with the extent of the job at hand that a united front to the many problems seemed a logical method of attack. Hence, about 200 directly interested in the airport situation swapped experiences and opinions at a convention at Cleveland, O., May 15, 16 and 17, under the auspices of the Airport Section, Aeronautical Chamber of Commerce.

These experts know what they want and are out to get it. The main problem is how to get these results they want and that is where the mutual exchange of ideas came in. Fully convinced that the airport as the contact point between air and land transport is the right hand man of general aviation activity, they are determined that this country shall have the best possible in that line. This attitude was responsible for the earnestness which characterized the convention sessions.

Precedent has little to offer by way of guidance. It is a new field, this matter of providing adequately for the proper co-ordinating of air and land transport in the present and future. It becomes necessary to draw on the experiences of other industries, the main cue being taken from the history of the railroads. Lessons learned by these agencies in costly experiments are meat for the airport men.

The convention adopted no resolutions establishing fundamental policies, but there was one outstanding point on which there was unanimous agreement without formal action. That was, that every effort possible will be made to look into the future and see to it that the shortsighted errors in terminal developments of other forms of transportation will not be repeated in aviation. That is the main achievement they seek.

Every section of the country and the Canadian government were represented. This meant that a wide variety of problems, colored by local conditions, were represented, and, as was to be expected, solutions differed. All of which served to emphasize the complexity of the airport situation and the value of interchange of ideas. Every prominent phase of the airport was covered by the papers read and the informal rubbing of shoulders which followed every session gave further opportunities.

What is to be the ratio between size and weight of aircraft in the coming years and the size of the airports and length of runways required to accommodate them, is a question which is causing considerable speculation. Gavin Hadden, civil engineer of New York, N. Y., discussed this in the first session.

The ultimate most efficient ratio between the size of aircraft and the size of the airport represents, of course, the most economical point of operation. What this point is, is still a mystery. A counterpart is in the railroad field where the 10 ft. gage probably would be the most economical and practicable, rather than the adopted standard gage. In this connection Mr. Hadden explained his "Triarc" method of getting the greatest possible use out of the area available. This consists of three arcs drawn about an equilateral triangle as a base. His theory is that where there are any restrictions in the size or shape of the airport area that largest number and the longest runways are provided by the equilateral triangle or the Triarc design.

THE IMPORTANTCE of expert soil analysis in coping with the draingage problem was brought out in an interesting paper by Wendell P. Miller, drainage engineer. Without a complete mechanical and chemical analysis it would be impossible to make an intelligent guess as to the drainage requirements, he said, and yet the vast majority of drainage systems are being installed merely by guess work. Analysis also helps solve the frost problem, he declared.

Farsightedness in airport construction in general was urged also for the buildings thereon in a paper read by F. H. Frankland, manager of the Technical Service, American Institute of Steel Construction. Naturally enough, he emphasized the advantages of steel and explained its characteristics under various conditions. Steel was readily adaptable, he declared to readjustments and additions, to meet changing conditions which progress may dictate.

This same spirit of farsightedness is being urged in still another quarter, that of the architectural aspect of construction. Why not have the airport and its buildings be things of beauty as well as utility? This proposition was championed by Francis Keally of the School of Architecture, Columbia University. The surroundings of an airport should be taken into serious consideration by the designers, he said.

Separation of the various activities at the airport was declared by George M. Lord, Western Air Express, to be a very desirable measure. He was the first speaker at the morning session, May 16, there being no evening session on the first day of the convention. General agreement to this view was registered by the convention. This would mean segregation as far as possible of the operations of transport planes, student machines, military

planes, etc. Mr. Lord recommended placing transport companies on one side of the airport, taxi companies on the extremities and military and student work on the opposite side.

Close co-operation between the airport officials and the transport operations was one of his main points. The airport in addition to being provided with all the appurtenances of a modern air harbor, should take into consideration the maintenance and operation of the transport schedules and should see to it that the transport planes are given preference in arrivals and departures.

TREATED SURFACE runways seem to be in the ascendent. While there still are many leaders definitely committed to the all-way turf airport as the ideal, it appears that there is a growing trend toward the adoption of surfaced landing strips or runways as solutions to the seasonal mud, frost, dust and soggy conditions. These difficulties are experienced particularly in the northern part of the country.

The cause of the treated and hard surfaced runway was voiced by three speakers, W. E. Rosengarten, traffic engineer of the Asphalt Association; George E. Martin, consulting engineer, The Barrett Company; and E. K. Smith of the Highways and Municipal Bureau, Portland Cement Association. Mr. Rosengarten recommended that the Aeronautics Branch adopt a shorter minimum length for a prepared runway on account of the quicker getaway obtainable.

The speaker leaned toward the lighter types of surfacing and described the so-called progressive type of development. This is the method of a light initial treatment which may be added to in succeeding periods, gradually building up a thick surface. This has the advantage of being economical and of providing something which will meet the seasonal difficulties with the lowest possible investment. He favored two parallel runways each 25 or 30 ft. wide as opposed to the single runway of a 100 to 150 ft. width.

Tar applications and penetration macadam surfaces also serve to meet the seasonal water, frost and dust problems at comparatively low expense, according to Mr. Martin. Here again, as in Mr. Rosengarten's paper, it was developed that providing for the landing shock of heavy planes on the airport surface must be provided for and the lessons derived from road construction for automobile traffic were heavily drawn upon. It was agreed that while the traffic is still comparatively light in this respect, the lighter types of construction are satisfactory for the present.

Sturdier construction in the form of cement runways was the theme of Mr. Smith's paper. He pointed to installations at the Ford Airport and the Littorio Airport, near Rome, as examples of this method. He claimed that besides adequately caring for aircraft traffic, the cement construction, applied to buildings as well as to runways, has a valuable psychological effect on the public.

WEATHER SERVICE PRACTICES are being developed rapidly and the work of the Department of Agriculture Weather Bureau was described by W. R. Gregg, senior meteorologist of the Bureau. The stations of the Bureau are being installed along the airways as aids to navigation and are operated in respect to the country-wide system primarily, although local aids are available also. Airports not on the airways but desiring weather service are being urged to install their own equipment of the type developed by the bureau.

"What more natural than that successful attempts will eventually be made to alter the weather itself, to the extent at least of dispelling the fog and low clouds, causing the troublesome squalls to follow detours remote from the main airways and possibly setting up zones in which only tail winds shall blow?" asked Mr. Gregg.

Capt. F. C. Hingsburg, chief of the Airways Division of the Aeronautics Branch, discussed matters of airport and plane lighting equipment, radio and weather aids and inter-field communication in a very interesting paper.

William B. Stout, speaking at the first annual dinner, May 16, announced he expects to see 100,000 privately owned planes within three years. Special provision must be made for the operations of this "average" flier who has not the advantages of the extensive training professional pilots receive. He prophesies, also, that extremely radical changes in aircraft design are due within a few years.

Privately owned advertising beacons came in for considerable criticism. Representatives of light manufacturing concerns and the Government agreed that the practice is becoming more and more of a detriment to night flying and opinion was strong that such installations should be discouraged. One delegate asserted that with the increasing number of private and official beacons, the lights have become very poor advertising mediums.

If any of those at the conference had failed to comprehend the increasing complexity of the legal aspect of airport establishment and operation, they were forcefully reminded of the fact by the excellent paper read by Prof. Harry J. Freeman of the School of Law, New York University, at the afternoon session, May 17. Space forbids an analysis of the many points developed by Mr. Freeman, but it is important to note that the volume of precedent in aviation law is reaching large proportions.

THE QUESTION of municipal liability for negligent operation of an airport seems to hinge upon whether or not the airport is being operated in a governmental or private capacity, or if a substantial revenue is being derived. In case of the latter two, liability looms, according to the statutes of individual states. New state legislation is required to eliminate this question.

On the other hand, according to Mr. Freeman, there is no such distinction in the matter of committing a nuisance. A municipality guilty of permitting a nuisance —that is, annoying low flying, continued noise and such disturbances—is liable irrespective of the nature of the function involved or the capacity in which the city is acting. Even the legislature cannot relieve this situation, he declared.

Federal and state aids to municipal airport projects, are expected by Mr. Freeman to increase and be legitimatized on an even sounder basis than the aids to highways. Some of these aids are exempting extra-mural airports from taxation by the state and the permission for joint municipal airport projects. Both of these are provided by legislation in various states. Such aids follow the old conception of the highways being the king's highways, in the eyes of the law.

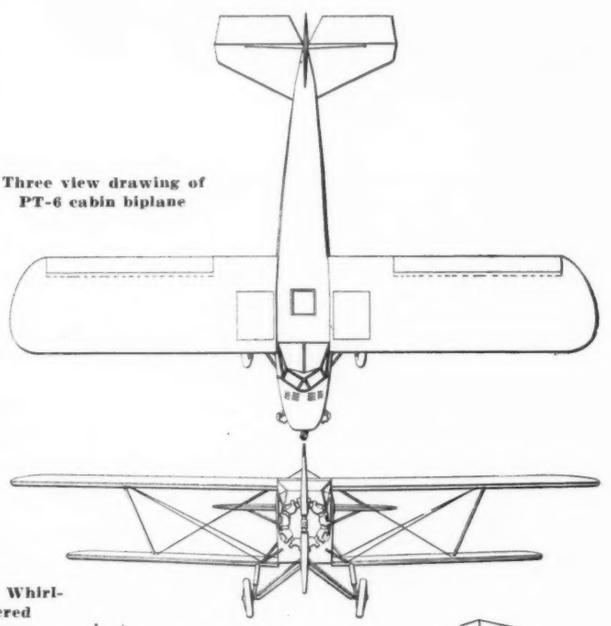
Remote operation of airport and intermediate landing field light by the pilot of a plane in the air was demonstrated by L. C. Simpson of the Westinghouse Electric & Manufacturing Company. The conference adjourned to some time in May next year at Buffalo. The general feeling was that considerable impetus had been given to the cause of American airports and that new or strengthened conceptions of the development projects will reflect indirectly the value of the convention.

THE *Cunningham-Hall*

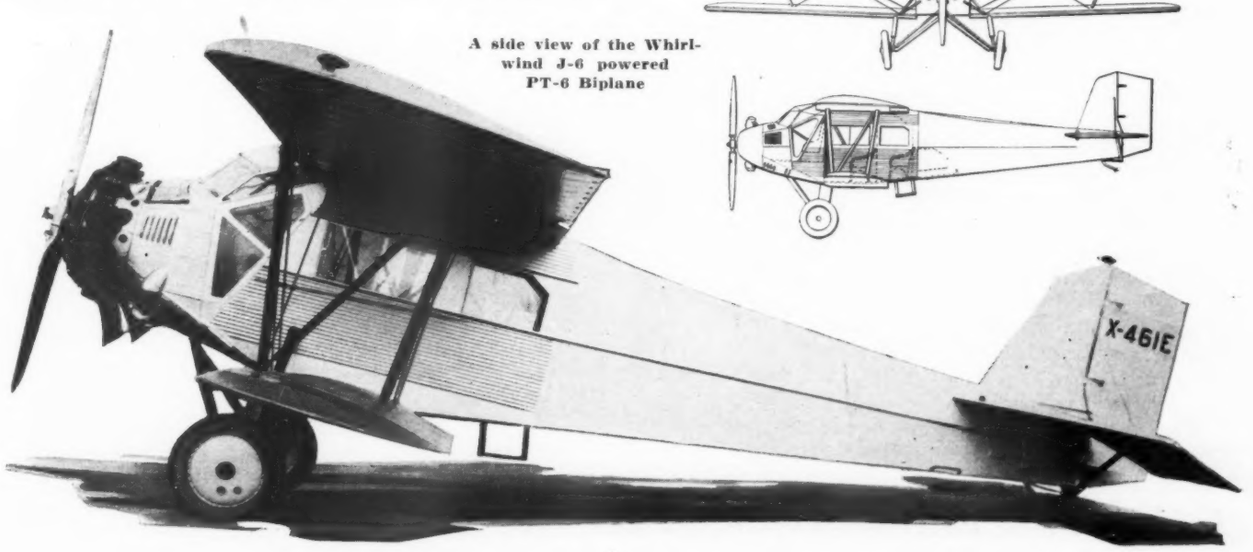
PT-6 CABIN BIPLANE

ONE OF the interesting new designs exhibited at the recent All-American Aircraft Show and indicating the tendency toward the use of metals in aircraft structures, is the PT-6 cabin biplane now under construction by the Cunningham-Hall Aircraft Corporation, Rochester, N. Y. This plane has a conventional welded steel tube fuselage and a duralumin and steel wing structure. It has a capacity of six persons and is powered with the J6 Wright "New Whirlwind" engine which develops 300 hp. The PT-6 has a wing span of 41 ft. 8 in., and overall length of 29 ft. 8 in., and overall height of 9 ft. 11 in. The weight of the plane empty is 2,475 lb. The gross weight of the plane is 4,200 lb., and the payload 1,000 lb. In tests, the plane attained a high speed of 140 m.p.h., and climbed at the rate of 1,100 ft. per min., with gasoline and 550 lb. of payload. The cruising speed is 118 m.p.h. and the landing speed is 45 m.p.h.

The all-metal wing structure consists essentially of duralumin ribs of the Warren truss type, and chrome molybdenum steel tube longitudinals. Tubing of $\frac{3}{8}$ in. O.D. and 0.028 in. wall, heat-treated, is employed in fabrication of the ribs, which are riveted with a special type of joint. These ribs have sustained more than 1,100 lb. in static tests. Upper wing beams are of the truss type, consisting of upper and lower longitudinals of $1\frac{1}{2}$ in. O.D., 0.049 in. walls and chrome molybdenum steel tubes, heat-treated to more than 125,000 lb. per sq.in. tensile strength. The upper longitudinals are reinforced for a considerable distance at the outer support by $1\frac{5}{8}$ in. O.D. 0.058 in. wall, chrome molybdenum steel tubes likewise heat treated. The main longitudinal members of the wing beam are spaced by double vertical diagonal members. The vertical members are spaced 16 in. apart. To avoid welding distortion, and subsequent heat-treatment, the vertical members and diagonals are bolted to the main longitudinals by $\frac{5}{16}$ in. diameter nickel steel bolts, and $\frac{7}{16}$ in. heavy

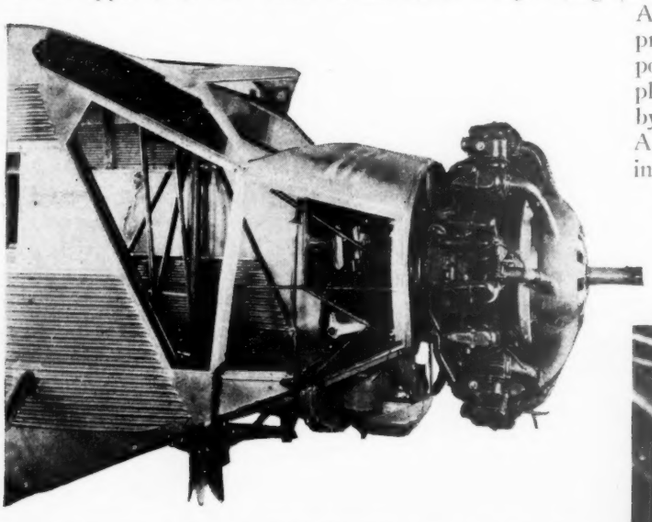


Three view drawing of PT-6 cabin biplane



A side view of the Whirlwind J-6 powered PT-6 Biplane

tube spacers being employed to insure excess shear and bearing strength. This type of construction insures a very rigid beam and permits of repair with ordinary tools. Compression struts are made of $\frac{7}{16}$ in. O.D. 0.057 in. wall duralumin tube Warren trusses. Hinges are located at compression strut points and transfer forces direct to the beam truss. The leading edge and aileron hinge beams are heat-treated duralumin sheet. Lower wing ribs are of the same design and material as the upper ribs, the beams in the lower wings being



large diameter chrome molybdenum steel tubes heat-treated, and the construction follows that of the upper.

Chrome molybdenum steel tubing is used throughout the primary structure of the fuselage. To facilitate production, the longerons are locally squared by means of special dies at the joints, thereby avoiding the usual curved bevel joints of the abutting members. The cabin is reinforced by corrugated duralumin sheet, heat-treated, 0.016 in. thick. This corrugated sheathing adds considerable strength, lessens crash and fire hazards, and provides an excellent wall for insulation and soundproofing purposes. Balsam wool is used in the walls for insulation against temperature and sound. Control surfaces have all metal structures, ribs being made of W.D. 1025 carbon steel tube, and other members of the same specification and of chrome molybdenum steel tube and strip. A conventional type of landing gear is employed and has been designed to avoid unnecessary universals and secondary members. Axles are made of $2\frac{1}{4}$ in. 0.120 in. wall chrome molybdenum steel tube, heat-treated to 200,000 lb. per sq.in., tensile strength. Aerol struts provide the shock absorbing medium. Tires are 32x6 in. Push pull tubes with nickel steel jaw bolts, pins and hexagonal head bolts are used throughout the control system. Aircraft steel cables and turnbuckles are also employed. Cables run through individual aluminum tubes in the cabin walls eliminating all possibility of fouling. Brake pedals, mounting brackets, and fittings, are high strength aluminum alloy castings. Bolts and pins subject to wear have been chromium plated.

The roomy main cabin accommodates four persons. The forward compartment accommodates the pilot and one other person. This compartment is separate from the main cabin which is accessible by means of an intercommunicating door. On either side of the pilot's compartment is a door so that entry and exit may be made from either side without going through the main cabin. The pilot's seat is adjustable enabling the pilot to suit the seat position or to quickly change his position in flight. The second seat in the forward compartment is folding and drops down below the floor when not in use. The arrangement of windows in the cabin and in the panels of the two doors afford the pilot exceptional vision. The seats in the forward compartment are made of sheet and tube duralumin, and are equipped with seat and back cushions. Stick control is standard equipment. A dual set of controls, easily installed or removed, is provided for use of a relief pilot or for instruction purposes. The instrument board is equipped with a complete set of flying and engine instruments, and is lighted by two sets of lights, one indirect and the other direct. A large baggage or merchandise compartment is located in the fuselage to the rear of the main cabin.

The Cunningham-Hall Aircraft Corporation as a business organization is a new company, but actually it has a long experience in the aeronautical and automotive fields. The corporation is a combination of two groups.

Left—Engine mounting and emergency door. Right—The wing structure showing internal bracing

In the first group are men who have been actively engaged in the design, manufacture and operation of airplanes for many years. Randolph F. Hall, chief engineer, has been in aeronautical engineering work during the past fourteen years.

Through an arrangement between the Cunningham-Hall Aircraft Corporation and the James Cunningham, Son & Co., the extensive plant facilities and the assistance and co-operation of the automotive experts and craftsmen of the motor car company are available to the airplane corporation.

The specifications as furnished by the manufacturer are as follows:

Length	29 ft. 8 in.
Wing span	41 ft. 8 in.
Height	9 ft. 11 in.
Wing area	370 sq. ft.
Weight empty	2,475 lb.
Pay load	1,000 lb.
Gross weight loaded	4,200 lb.
Wing loading	11.3 lb. per sq. ft.
Power loading	13.1 lb. per hp.
High speed	140 m.p.h.
Cruising speed	118 m.p.h.
Landing speed	45 m.p.h.

GENERAL NEWS

Bellanca and Bernard Awaiting Atlantic Calm

OLD ORCHARD (ME.)—As AVIATION goes to press, two planes are held here ready for flights across the Atlantic as soon as word is received that the ocean weather is fitting. The first is the Whirlwind-powered Bellanca "Green Flash," in which Roger Q. Williams and Lewis A. Yancey hope to fly to Rome, while the second is the Hispano-Suiza-powered Bernard monoplane, to be flown by the Frenchmen, Jean Assolant, Rene le Fevre, and Armeno Lotti, in an attempt to span the distance between this country and Paris, France.

Tests for these flights were initially made at Roosevelt Field, L. I., then with everything in readiness, the machines were piloted to this trans-Atlantic take-off point to await good weather. Thus far the skies have been against the airmen, who have kept in touch with Dr. James M. Kimball, of the New York Weather Bureau, hoping to receive the word which will be a signal for the start.

La Salle Leases Plane Factory

JOLIET (ILL.)—The La Salle Aircraft Corporation, a $40,000 concern, has leased a factory at 111 Maple Street here for production of its light weight two-place plane which is to be put on the market soon at $2,995. Plans of the firm, which is headed by C. C. Flagg, is a one plane per week schedule. A 60 hp. LeBlond engine will power the craft, which is 21 ft. 6 in. in overall length, 7 ft. 3 in. in height, and 32 ft. in span according to announcements.

Texans Fly Whirlwind Ryan To 172 Hr. Endurance Mark

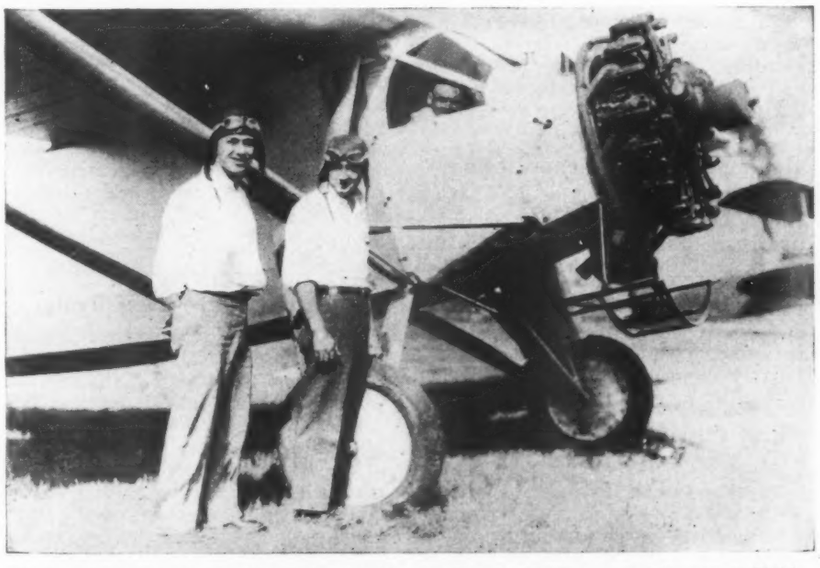
Plan to Re-Pilot As Well as Refuel

OAKLAND, (CALIF.) — James Warner, radio operator on the Southern Cross flight, and Harry Abbott, Mills Field pilot, plan a refueling endurance attempt flying an Axelson powered Sierra monoplane, made by Aircraft Industries, Inc., this city.

In addition to refueling, Warner and Abbott also contemplate changing airmen during the flight. The relief pilot will slide down the refueling hose to the plane, according to their plans, and the pilot going off duty will parachute to the ground.

To Offer Whirlwind Pheasant

FOND DU LAC (WIS.)—According to reports here, Pheasant Aircraft Corporation, controlling interest in which has been acquired by T. W. Meiklejohn, this city, will offer its three-place biplane with Whirlwind power following necessary adaptation from the OX model.



R. L. Robbins (left) and Jim Kelly (right) standing beside Ryan used in record flight. Note cat walk used for servicing engine in the air.

New Mark Established Through Refuel Contacts

FORT WORTH (TEX.)—All sustained flight records were broken here Sunday afternoon, May 26, when Reginald L. Robbins and James Kelly landed their rebuilt Ryan monoplane "Fort Worth" at Meacham Field to establish an uninterrupted flight record of 172 hr. 32 min. 1 sec., a mark surpassing that of the Army "Question Mark" by more than 21 hr. A Wright Whirlwind J-5 engine bearing the factory date 8-25-27 powered the cabin plane during its long grind of more than a week.

With the refueling successful, the plane apparently could have been kept in the air longer, but a cracked propeller necessitated bringing the craft to earth. The trouble was started, it is said, when Kelly's safety belt buckle one day slightly engaged the blade while he was standing on the cat walk oiling the rocker arms of the J-5. Stormy weather which followed further opened the nick in the blade until it was dangerous to continue with it. With this menace, the airmen landed the Ryan at 4.05 p.m. May 26.

Refueled From Another Ryan

The fliers had taken off from Meacham Field at 11:33 Sunday, May 19, carrying some 250 gal. of gasoline. Early Monday morning the tanks were first replenished by 110 gal. of fuel taken through a 37 ft. hose from another Ryan, the "Midland," flown by K. K. Hoffman and H. S. Jones. Refueling continued throughout the week at an average of twice daily.

The flight was made wholly in the vicinity of Meacham Field here with the exception of a period May 25, when an electrical storm threatened and the airmen flew to Love Field, Dallas, to await clear weather. Regulations demand that a record flight of this kind end at the same field from which it starts, hence the fliers "hugged" Meacham in order not to suffer through a forced landing elsewhere.

Instruments, Oil, and Fuel Used

The Brougham plane was fitted, according to specifications of the fliers. The roof was removed from the back of the cabin to enable refueling. Instruments used were Consolidated Jones tachometer, Taylor Instrument Company's Tycos altimeter, Boyce Moto-Meter, Pioneer Instrument Company bank and turn indicator and rate of

(Concluded on page 1889)

Tomlinson Wins Curtiss Trophy Race

Averages 175.01 M.P.H. Flying a Hawk Seaplane

WASHINGTON (D. C.)—At the Anacostia Naval Air Station May 25 speed records for standard military seaplanes were shattered when Lieut. W. C. Tomlinson, flew his Wasp-powered Curtiss Hawk over the 100 mile course to become the winner of the tenth Curtiss Marine Trophy Race from 23 other contestants. His average speed was 175.01 m.p.h.

Nearest approach to this speed was made by Capt. A. H. Page, Jr., of the Marines, also in a Curtiss Hawk, who made 151.30 m.p.h.,

Second place in the contest officially went to Capt. J. T. Moore, of the Marine Corps, who flew his Curtiss Hawk at an average speed of 150.74 m.p.h. Lieut. E. W. Rounds, U.S.N., in a Vought Corsair, observation plane group, was third with a record of 145.86 m.p.h.

Lieutenant Tomlinson's speed, which is some 18 m.p.h. faster than heretofore recorded for military seaplanes, was said to have been made possible by the new N.A.C.A. cowling.

Leaders of the five classifications of the races were awarded gold watches by the N.A.A. The awards went to Lieutenant Tomlinson of the fighter group, Lieutenant Rounds for the Corsair plane observation craft group, Lieutenant Montfort for the Loening amphibion group, whose average speed was 116 m.p.h.; Lieut. W. E. Cleaves of the Hornet-powered Martin torpedo plane group, who averaged 114 m.p.h., and Lieut. W. L. Peterson of the training plane group, who averaged 111 m.p.h.

Great Lakes Buys Wills Plant

CLEVELAND (OHIO) — The Great Lakes Aircraft Corporation, this city, has bought the Wills-Ste. Claire automobile factory at Marysville, Mich., and within 60 days will begin manufacture of airplane engines and commercial planes there, it is announced by Col. Benjamin F. Castle, president of the Cleveland company. The Marysville plant has 350,000 sq.ft. of floor space. The Cleveland plant will continue to expand its manufacture of training planes. Within the next 60 days the company expects to have 10,000 more feet of floor space available in a new wing.

Winton Enters Air Engine Field

CLEVELAND (OHIO)—Entrance of the Winton Engine Company here into the aviation engine field became known recently with the incorporation of the Winton Aviation Engine Company under Ohio laws. The company plans manufacture of both gasoline and Diesel airplane engines.

Indiana Flying Arrest Protested

INDIANAPOLIS (IND.)—Indianapolis' "flying cop," Sergt. Earl Halstead, made an arrest here recently when he forced a plane of Capitol Airways to land because in his opinion it had flown too close to a balloon from which a parachute jumper was about to descend. Capitol Airways officials, however, disagreed with the Sergeant, asserting that the Capitol plane had not flown too close and furthermore the Capitol plane had been endangered by the police plane.

School Inspectors Begin Rating Work

WASHINGTON (D. C.)—The newly-organized group of flying school inspectors of the Aeronautics Branch, Department of Commerce, have taken to the field to begin their work of examining and rating civil aviation schools after having completed a course of instruction here. Their work is the outgrowth of the new rating regulations recently proposed by the industry in order to help prospective flying students pick training schools best suited to their needs.

G. G. Budwig is chief of the Inspection Service. Following are the new inspectors in this service: J. S. Marriott and J. L. Kinney, assistant chiefs of the Inspection Service; R. L. Copsey, assigned to New York district; L. W. Jurden, assigned to Dallas district; R. I. Hazen, assigned to Los Angeles district; Freeman Albery, assigned to Detroit district; Hugh Brewster, assigned to Washington, D. C. district; George Gardner, assigned to Chicago district, and A. K. Koerbling, assigned to Kansas City district.

Boeing Plans Air School Chain

SEATTLE (WASH.) — Boeing officials expect to announce, shortly, plans for flying schools, and it is expected that the first will be started at the Oakland, Calif., airport. Company officials have been working on plans for such an added activity for some time and the personnel for the school has been tentatively decided upon, it is understood.

Coast Firm Orders Eaglerocks

LOS ANGELES (CALIF.)—The Aero Corporation of California has contracted with the Alexander Aircraft factory for 54 Eaglerock planes to be delivered before the end of 1929, according to E. Burrell Smith, sales manager.

Sixteen Craft Fly In Northwest Tour

ST. PAUL (MINN.)—With Charles W. "Speed" Holman, operations manager of Northwest Airways, Inc., as leader, 16 airplanes left the municipal airport here to fly to airplane meets at Grand Forks and Winnipeg May 24.

The planes formed a good will tour sponsored by the St. Paul Association. In all, 49 persons participated in the trip. In Mr. Holman's Hamilton plane were A. Nakashian, R. J. Dunlap, L. F. Dow, E. L. Vogt, Fred Fellows and Julius Perlt.

Others participating in the tour were Maj. Ray S. Miller, Lieut. A. W. Nelson, Lieut. T. D. Lane, Capt. Gage Mace and Lieut. A. W. Nelson, all of the 109th aero squadron of the Minnesota National Guard; Mrs. Phoebe Hargreaves Omlie, Al Falk, G. F. Cornelius, C. J. Morey, W. Ramsey, R. Bouchard, Carl Luethi, Roger Sargent, T. "Thunder" Johnson, Mark Hurd, R. Lamont, J. Phelps, Delmar Snyder, and Chadwick Smith, pilots and co-pilots; and J. L. Harper, A. E. Greenman, W. Peterson, C. J. West, E. B. Stern, William Schley, Jack Mackey, C. J. Coleman, John Lane, L. W. Cameron, L. Seamer, P. C. Bradley, Jr., J. M. Clancy, H. C. Wenzel, Otto Rohland, G. C. Sudheimer, H. McDonald, E. J. Jacobson, Tom Murphy, W. W. Magee, T. W. Touhy, C. D. Johnston and A. E. Johansen, passengers.

The planes were welcomed at Grand Forks, where they stopped overnight. At Winnipeg they were guests of the Winnipeg Flying Club, sponsoring the meet. The return trip was made May 26.

To Test New Wasp Knoll

WICHITA (KAN.) — A new model cabin plane has been turned out by the Knoll Aircraft Corporation here and is now ready for tests, according to reports. It is a five place Wasp-powered craft with the cabin seating four and with the pilot riding in an open cockpit in the turtle back of the fuselage. There is ample room for baggage. The last four-place J-6 Knoll built has been sold to Inter-Americas De Transportes Aereos, S. A., of which J. Santibanez Joffre is president. Production will be raised, it is said, to several planes per week as soon as the company moves to its new factory on its own airport east of Wichita.

California Tour Starts Today

SAN FRANCISCO (CALIF.) — Arranged by the National Aeronautical Association the "First California Air Tour" will start June 1, when a large delegation of fliers will take off from Mills Field following a feature program of aerial events. The itinerary will include eight California cities. In each of the cities on the tour the fliers will be officially entertained, and special field days have been arranged for at the various airports.

Bendix Will Acquire More Accessory Units

SOUTH BEND (IND.) — Announcement will be made by Bendix Aviation Corporation in the near future of the acquisition of two additional units engaged in automotive and aviation accessories through an exchange of stock, it was reported her today.

In addition to the stock transfer, a small portion of Bendix Aviation's $26,000,000 cash reserve probably will be used in the transaction. The new units are closed corporations, it was learned, their stocks not being listed on either the Chicago or New York exchanges.

At the local Bendix offices, Walter J. Buettner, secretary, in the absence of Mr. Bendix who is in New York, said that negotiations for the acquisition of new units to the aviation group are in progress.

For several weeks it has been general gossip in financial circles that further expansion is being planned by the firm. The authorized capitalization of Bendix Aviation, a $140,000,000 concern, is such as to permit issuance of additional stock in connection with any further expansion without calling a meeting of the stockholders, there being unissued approximately 800,000 shares of stock.

Instrument Service Fleet for Consolidated

NEW YORK (N. Y.)—A fleet of instrument service planes is shortly to be put into use by the Consolidated Instrument Company, this city, it is announced. The first plane has already been delivered.

Installed in the spacious cabin of this initial machine will be a complete instrument laboratory. This will be used for testing purposes and for servicing Consolidated instruments in other craft. The new fleet is also to be used for sales work and for emergency deliveries.

The first plane is to be christened "The Governor" by Mrs. Franklin D. Roosevelt, wife of the Governor of New York State. This plane is a six-place Wright J-6 powered Travel Air monoplane.

Haskelite in New Boeings

CHICAGO (ILL.)—Boeing Airplane Company, Seattle, Wash., is making extensive use of Haskelite plywood in the construction of its new eighteen passenger transports which are to carry mail and passengers between the West Coast and Chicago. This plywood is made by Haskelite Manufacturing Corporation, Chicago.

Army Contract to Meyrowitz

NEW YORK (N. Y.) — Contract for 1,268 pairs of flying goggle lenses of the white cylindrical type B-6 has been awarded E. B. Meyrowitz, Inc., this city, maker of Luxor Aviation goggles, by the U. S. Army Air Corps, Wright Field, Dayton, Ohio.

Minnesota Companies Merge

CROOKSTON (MINN.)—The merger of the Lake of the Woods Aviation Company, Baudette, Minn., and the Red River Airways, this city, is announced by Burt Brown, manager of the latter company. The new organization, known as the Red River Airways, will have headquarters in Crookston with Brown as manager and Paul Milner as chief pilot. A. J. Klimek has been the head of the former Baudette firm.

Prepare to Construct Pitcairn Autogiro Plant

PHILADELPHIA (PA.) — Building materials arrived this week at Hallowell, Pa., for the construction of a factory in which Pitcairn interests will manufacture autogiros. The subsidiary company holding American manufacturing rights is incorporated as the Pitcairn-Cierva Autogiro Company of America.

The factory, for which ground will be broken within a few days, is to be built of brick, concrete and steel at a cost of $100,000. It will serve as the first unit of the plant which will produce "windmill planes" on a commercial scale before the end of the year.

Pitcairn's manufacture of its present types of aircraft will be transfered in steps to the new building. The old factory at Bryn Athyn will be used as a research laboratory.

Deliver 27 Waco Planes

TROY (OHIO)—Recent delivery of 27 Waco planes is anounced by the Advance Aircraft Company, this city. Carload shipments were made to the American Aircraft Corporation, Los Angeles; Dennison Airplane Sales Company, Atlantic, Mass.; Rankin Flying Service, Portland, Ore. Bernard Airlines, Youngstown, took flyaway delivery of one Waco; Grand Island Flying School, Grand Island, Neb., flew away three for training purposes; Ted Kincannon, Louisville, flew away one; Tex LaGrone, Kansas City, hopped off with a Waco 90; Mid-West Airways, Aurora, Ill., also took a Waco 90. The Northwest Airways, St. Paul, took a Hisso Waco for air mail service and V. A. Rickard of Schenectady received one.

More Hartford Land for United

HARTFORD (CONN.)—The United Aircraft & Transport Company, which recently secured by option 500 acres of land in East Hartford for a $2,000,000 airplane and airplane engine manufacturing plant, together with an aviation field, announced this week that an additional six and one-half acres have been secured on the banks of the Connecticut River. It is planned to build piers for river transportation of freight and for use of amphibions and seaplanes. The new property, 1,400 ft. on the river and 200 ft. wide, is easily accessible from Main Street.

Blackburn Goes With Holding Firm

Joins Mahoney-Ryan And A.D.C. in New Group

DETROIT (MICH.)—Close on the heels of the late announcement that Mahoney-Ryan Aircraft Corporation, St. Louis, is merging with Aircraft Development Corporation, this city, comes word that the Blackburn Aircraft Company, London, England, is to be included in the combination which is to be operated by a holding firm probably to be named Continental Aircraft Corporation.

Blackburn planes of all types, both military and commercial, will be built at Detroit, according to the statement, with a large new craft, enabling conversion from sea to land use through interchangeable wings initially going into production. Blackburn rights, it is stated, are held for both North and South America with the single exception of Brazil, which is now the target of negotiations.

According to an authoritative source, the holding firm is to develop into a powerful organization which will offer a complete line of aircraft, including the smallest and the largest, commercial and military, land, sea and amphibion planes. The lighter-than-air field is also represented, the Aircraft Development Corporation planning extensive work in this line following the metal dirigible now under construction.

Edward S. Evans, of the National Glider Association, is mentioned as a "leading light" of the new combination. William B. Mayo, named to be connected with the holding group, offers a background of Ford aeronautical experience through his identification with the Stout Metal Airplane Division of Ford, while General Motors Corporation also makes contact through the fact that C. S. Mott and Charles F. Ketering, of G.M.C., are reported with the organization. Another aeronautical connection is made through the control of Northwest Airways by General Motors men.

Seven Aristocrats to Tire Firm

AKRON (OHIO)—Purchase of a fleet of seven General Aircraft Company "Aristocrat" planes is announced by the General Tire & Rubber Company, Akron, Ohio. The planes, before being delivered to the Akron firm, will make a tour of the United States, Mexico, Cuba, and Canada. Then the fleet will be concentrated at Akron to be used by the rubber company for business purposes.

Test Hall Aluminum Fighter

BUFFALO (N. Y.)—Flight tests of the new Hall Aluminum Aircraft Company's Navy fighter single-place monoplane are reported here. Captain Rogers, Navy pilot, flew the Wasp-powered plane in the tests.

Drawing Up Time Payment Regulation

Chamber Action Follows Conference at Washington

NEW YORK (N. Y.)—Uniform legislation applying to time-payment financing of airplanes is being drawn up by a committee of the Aeronautical Chamber of Commerce. The action of the legal and legislative committee is a direct outgrowth of the conference at Washington between representatives of finance companies and William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics.

The finance companies formed a new section of the Aeronautical Chamber of Commerce to work out the problems involved in time-payment financing of airplanes and equipment, and elected T. T. Hildebrandt, of Commercial Investment Trust, Inc., chairman of the section. The section has been promised the cooperation of the Department of Commerce through Assistant Secretary MacCracken, who suggested the joint conference in Washington.

Mitchell and Brattain Appointed

Under the new regulations, being drawn up, the finance companies will be recorded as the owner of a plane bought on the time-payment plan, but will not be held subject to fines imposed by the Department of Commerce for stunting or other violations of air regulations. The name of the finance company will become a portion of the Department of Commerce records to prevent the influx of private capital through dummy companies set up for gaining control by other than domestic concerns. The records will distinguish clearly between the owner for financial purposes and the actual purchaser.

C. W. Mitchell, of Aviation Credit Corporation, and Paul H. Brattain, manager of the Washington office of the Aeronautical Chamber of Commerce, have been appointed to work out a cooperative agreement of Department of Commerce officials through which the Government would notify the finance companies of applications for the relicensing of planes on which liens exist.

Finance Firm May Ground Craft

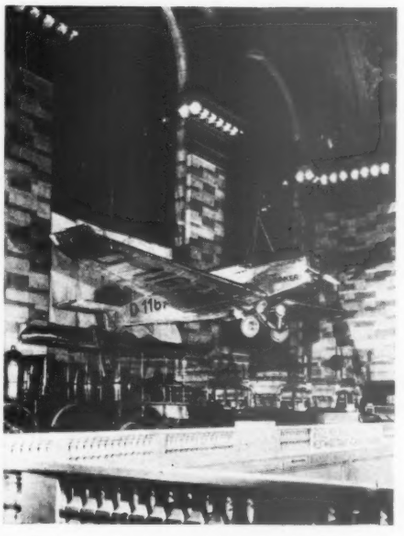
This will enable the finance companies to "ground" planes through repossession because of violation of contract, contending that the attempted resale jeopardizes its interests in the plane.

The Motor Finance Corporation, Lafayette, Ind.; Bankers Commercial Security Company, New York; National Discount Corporation, South Bend, Ind.; Aviation Credit Corporation, New York; National Surety Company, New York; and the Aero Insurance Group have been added to membership in the Aeronautical Chamber of Commerce in addition to aircraft companies, already members, which are operating finance companies of their own.

Agents' Group Adds Members

NEW YORK (N. Y.)—Three new members have been added to the dealer and distributor section of the Aeronautical Chamber of Commerce formed recently of aircraft representatives in the New York metropolitan area. They are Capt. A. O. Donaldson, Newark Air Service, Newark, N. J.; D. J. Barrett, Jr., president of the Westchester Airport Corporation; and Arthur Ramson, Seaboard Aircraft Corporation, New York. Captain Donaldson was named to the executive committee.

Bremen Returns



Showing the Junkers monoplane Bremen, first plane to be flown across the Atlantic from the East, on display at the Grand Central Terminal, New York City. It was presented to the City of New York by the late Baron von Huenefeld, backer and passenger in the historic flight.

Form Porterfield Holding Firm

KANSAS CITY (MO.)—According to reports here, a $25,000,000 holding company is under organization to be known as Porterfield Aviation Interests, Inc. The American Eagle Aircraft Corporation is a leading firm in the combination, it is said, and the second concern to be controlled will be Lincoln Aircraft Company, Inc., Lincoln, Neb., maker of the Lincoln-Page craft.

The Lincoln brings with it the rights to the Wright-Morehouse engine, now known as the Lincoln Rocket. It is stated that the Nebraska firm will be operated as a division without change in personnel.

Sanction National Air Tour

NEW YORK (N. Y.)—The fifth annual National Air Tour, sponsored by Edsel B. Ford, has been sanctioned by the Aeronautical Chamber of Commerce.

Improvements Bring New Standard to $9,750

PATERSON (N. J.)—New Standard Aircraft Corporation, Paterson, N. J., has increased the price of its model D-25 to $9,750 according to George Daws, sales manager of the company.

The increase was made necessary by a number of changes and improvements which include center-section wings, tail wheel, balanced ailerons, improved cockpit upholstery, safety glass windshields, and pedal operated brakes. In addition, the finish of the plane has been considerably improved and a starter added to the equipment.

Equipment now includes brakes, navigation lights, starter, adjustable stabilizer, split-axle landing gear with oil-draulic shock absorber struts and complete cockpit, engine, and propeller covers. Instruments include compass, air speed indicator, tachometer, altimeter, oil pressure gauge, oil temperature gauge and ball bank indicator. The engine is a Wright J-5 Whirlwind.

A production schedule calling for forty model D-25 planes during the months of June, July and August is announced by the New Standard Aircraft Corporation. Ten are planned during June, fourteen during July, and sixteen for August. According to Louis G. Randall, general factory manager, the plant will be producing one a day of these models by early fall.

Yonge in OX Robin Sets 25 Hr. Endurance Mark

JACKSONVILLE (FLA.)—An endurance record for 90 hp. airplanes was established here by Laurie Yonge, Jacksonville aviator, when he landed his OX-5 Curtiss Robin upon the beach after remaining aloft 25 hr. 5 min. The previous mark for planes powered with similar engines was held by Miss Elinor Smith, of New York. She remained in the air 13 hr. 19 min.

In establishing his record, Yonge successfully combatted two menacing thunderstorms which forced him to deviate from his monotonous circle over the beach. At one time he was compelled to fly as far as Palatka, in the central part of the state, to avoid inclement weather.

Yonge took off from the beach at 12 noon, May 19, with 156 gal. of gasoline and five gallons of oil. The load carried by his plane was put at 1,400 lb.

New Stinson for Store Firm

KANSAS CITY (MO.)—Woolf Brothers, operating a chain of stores, have purchased a four-place Stinson monoplane to replace the six-passenger Stinson Detroiter which has been used by the firm for some time. A faster craft was desired by the officials, who fly between Kansas City and Memphis, Tulsa, St. Louis, Dallas, Norman, Okla., Lawrence, Kan., and Columbia, Mo., where the stores are located.

Aerial Mapping Firm Organized at Portland

PORTLAND (ORE.)—Organization of a new air concern and several changes in personnel, partly the result of the new company, have just been made at the Port of Portland airport.

The new company is Aerial Mapping Engineers, Inc. Its organizers are Edward B. Shields and Capt. Beverly Clark, of Shields-Clark Flying Service, and Capt. F. O. Mercer and Lieut. Gordon E. Mounce, formerly photographer and pilot, respectively, for Continental Airways, Inc., another mapping company. Mapping and survey work will be carried on by the new company.

F. A. Robbe, who has been in charge of sales for the Mackenzie-Morrow Aviation Company at the airport, has gone with the new organization in a similar capacity. W. M. Gainer, who has been a student of the Mackenzie-Morrow Company for some time, succeeds Robbe.

J. L. Meadows, formerly of the Longview, Wash., Flying Service, has also joined the Aerial Mapping firm as an additional pilot. This gives the firm three pilots and two photographers.

Al Davis, who has been chief pilot for the Mackenzie-Morrow Company, since its organization, has left the staff to enter service of West Coast Air Transport, flying a Ryan Brougham recently added to the Portland-Seattle schedule. He makes a daily round trip. Jim Clark, former army flyer, has come from Tacoma, Wash., to take the place left vacant by Davis. C. B. Stead has has joined the West Coast staff of pilots, flying the Portland-San Francisco run.

Fights Rum From the Air

ALBANY (N. Y.)—Extensive use of an airplane is being made by Palmer Canfield, prohibition administrator for the northern district, in planning the summer campaign to be waged against Border rum runners. Accompanied by a corps of agents, Mr. Canfield is making a series of survey flights in a Mohawk Airways Ford over the territory in his jurisdiction, so that his aides will have a clear conception of the position of roads they later will patrol.

Aviation Corp. in Insurance

NEW YORK (N.Y.)—Entrance of The Aviation Corporation into the aero insurance field is now reported, it being said that two air insurance organizations, to be known as the Aviation Insurance Company and Aviation Indemnity, are planned by the holding firm.

Illinois-Iowa School Moving

DAVENPORT (IA.)—Flying school of Illinois-Iowa Airways Co., Inc., which has been located at Rock Island, Ill., is shortly to be located at the Division Street field at this city, Lawrence Pedigo, president and general manager. Fifty are enrolled.

Plan Arrow Service Stations

NEW YORK (N.Y.)—Service stations throughout the country for the convenience of owners of Arrow Sport planes, are planned by Arrow Aircraft and Motors Corporation, Havelock, Neb., according to reports. It is said that 25 bases are to be established, about half of them to be ready this year. It is stated, furthermore, that six assembly plants for this plane are to be established.

Exclusive Magneto Firm at Tulsa, Okla.

TULSA (OKLA.) — Founded in the year 1919, Magneto Ignition Corporation, this city, has built up a strong business exclusively catering to users of magnetos. As southwestern distributor for Scintilla Magneto Company, Sidney, N. Y., the firm represents the latter in Kansas, Missouri, Texas, Arkansas, Oklahoma, and Louisiana, with subdealers operating at Wichita, Kan., El Paso, Ranger, Big Spring, Amarillo, Fort Worth, San Antonio, and Houston, Tex., and New Orleans, La.

One of several branch stores planned by Magneto Ignition Corporation has been established at Seminole, Okla. Magneto Ignition is also official representative of American Bosch Magneto Corporation, Eisemann Magneto Corporation, Splitdorf Electrical Company, K-W Magneto Corporation, Apollo Magneto Company, Inc., and Webster Magneto Company. The firm also distributes Splitdorf, Bosch, Sootless, Rajah, Fyrac, Mosler, and Stitt spark plugs as well as Packard Ignition Cables.

Standard Steel Earnings Double

PITTSBURGH (PA.)—It has been announced that the earnings of the Standard Steel Propeller Company for the first quarter of 1929, and the business on hand, has doubled that of the first quarter of last year. The board of directors of the company was increased from seven to nine at a recent stockholder's meeting, and a new office, chairman of the board was created. The directors have not met to elect their head. Six of the old directors were re-elected with John A. Ingram, C. F. Kiefer and J. H. Hillman, Jr., added. The other directors are Harry A. Kraeling, Samuel E. Dieschner, Thomas J. Ingram, John M. Haverty, John F. White and Howard S. Evans.

Plan Ethyl Aero Gasoline

NEW YORK (N.Y.) — Manufacture and distribution of an Ethyl aviation gasoline, a blend of high-test fuel and the Ethyl anti-knock product, is now planned by Ethyl Gasoline Corporation, according to reports.

Endicott Meet June 8-9

ENDICOTT (N. Y.)—An air meet in which some 50 planes are expected to compete is being sponsored for June 8-9 by the Endicott Aero Club, Inc.

Butler Building New Plant at Kansas City

KANSAS CITY (MO.)—A $250,000 airplane factory, the first to front upon that part of the Municipal Airport reserved for industries, is announced by the Butler Aircraft Corporation, manufacturers of the Butler "Black Hawk."

The erection of the three initial buildings will begin shortly. The Butler Manufacturing Company's all-steel structures will be used—the monitor type with high arched roof. By reason of the easily erected sectional type of building and large construction forces employed, the plant will be completed and in full operation within 60 days.

The main factory building is to be 80 ft. wide and 112 ft. long. Adjoining this unit will be two separate structures each 48 by 80 ft. in size. One of them will house the offices, the engineering and drafting departments and the experimental laboratories. The other will cover the assembling and finishing departments.

The plant capacity from the beginning will be one completed plane each day. This capacity will be increased as rapidly as justified by sales. A fifteen-acre tract has been leased under the Municipal Airport plan which provides ample room for enlargement. Included in the new factory investment is considerable new machinery of the most modern type.

Several types of planes will be produced, principally the Butler "Black Hawk," both open and cabin type. Mail planes will be built and also a training plane type now being developed by the Butler designers and engineers.

In enlarging the organization for increased production there has been brought into the personnel, Milton C. Bauman, an engineer from Michigan University, whose entire career since graduation in 1917 has been in the aircraft development. He was an associate of Orville Wright in the Dayton-Wright Company.

Curtiss-Caproni Leases Tract

BALTIMORE (MD.) — The Curtiss-Caproni Aircraft Corporation has signed a contract and lease with the city of Baltimore for the rental of a twenty-five acre tract of land on the Municipal Airport at an annual rental of $15,000 for a period of twenty years. At the expiration of this period the company has an option for renewal for another twenty years on a rental basis to be determined by the value at that time. A second option provides for an additional twenty-year lease.

Fradiss With Fokker Firm

HASBROUCK HEIGHTS (N. J.)—Jean Fradiss is associated with the Fokker Aircraft Corporation as engineer, it is stated here, and is not connected with the Sullivan Aircraft Corporation, Wichita, as incorrectly reported recently.

Honor Many Airmen At A.S.M.E. Meeting

ST. LOUIS (MO.)—Approximately 60 persons were to be recognized for their services in the promotion of aeronautics in an "aeronautical roll of honor" scheduled to be read this week at the Third National Aeronautic Meeting of the American Society of Mechanical Engineers. This was to be in addition to the presentation of gold wrist watches to twelve outstanding contributors to aviation.

Included in the roll of honor are: Oliver Parks, president of Parks Airports, East St. Louis; Dr. J. S. Ames, chairman, National Advisory Committee for Aeronautics; Porter Adams; Dr. E. F. W. Alexanderson, General Electric Company; Dr. Karl Arnstein, vice-president, Goodyear-Zeppelin Corporation; Sen. Hiram Bingham, William Brock, Comdr. Richard Byrd, Dr. Burgess, director, U. S. Bureau of Standards; G. M. Bellanca, president, Bellanca Aircraft Corporation; Capt. Thomas Carroll, chief pilot, N.A.C.A.

Others Named

C. D. Chamberlin, Lieut. C. C. Champion, U. S. N.; the late Capt. Charles B. D. Collyer, president, Aviation Service Corporation; Lieut. W. S. Diehl, U. S. Navy Bureau of Aeronautics; Irving W. Glover, Assistant Postmaster; Col. Arthur Goebel, Daniel Guggenheim, Harry Guggenheim, William Gregg, assistant chief, U. S. Weather Bureau; Harris M. Hanshue, president Western Air Express; Lieut. A. F. Hegenberger, U. S. A.; Col. Paul Henderson, C. M. Keys, President, Curtiss Aero & Motor Company; C. E. Lawrance, president Wright Aeronautical Corporation; Capt. Emory S. Land.

Dr. G. W. Lewis, N. A. C. A.; Col. Charles A. Lindbergh; Paul W. Litchfield, president Goodyear Tire and Goodyear-Zeppelin Corporation; Lieut. Lester Maitland; George J. Head, vice-president Pratt & Whitney Aircraft Company; Rear Adm. W. A. Moffet, chief of the U. S. N. B. of A.; Capt. H. C. Richardson, U. S. N., B. of A.; Comdr. C. E. Rosendahl, Edward Schlee, Maj. Carl Spatz, Army Air Service; Lieut. Harry A. Sutton; Chance Milton Vought, consulting engineer, Chance Vought Corporation; Fred E. Weick, Comdr. K. E. Wilson, chief of design section, B. of A.; Lionel M. Woolson, Packard Motor Car Company, and the late Capt. Hawthorne C. Gray, balloonist.

Forty-Three Papers Read

At the meeting, 43 papers were to be presented by prominent speakers. Outstanding aviation leaders from the United States and abroad were to attend, including Viljalmur Stefansson and Capt. Sir George Hubert Wilkins, explorers. An aeronautical exhibit was to be held in the Jefferson Hotel and airplane exhibits were to be held at Lambert-St. Louis Field and Parks Airport.

Colonial to Holding Firm

NEW YORK (N.Y.)—With 76 per cent of Colonial Airways stockholders reported in accord, The Aviation Corporation, powerful holding firm, has now acquired control of Colonial Airways Corporation, according to announcements by holding company officials. Routes flown by Colonial include the New York-Boston, New York-Montreal, and Albany-Cleveland mail runs.

Fairchild Firm Opens School at Farmingdale

FARMINGDALE (L. I., N. Y.)—A complete flying school has been opened here at the Fairchild company airport by the Fairchild Aeronautical Institute. A full ground, flying, and instructors' post-graduate course is being offered.

Courses are open to the public at a fee of $30 an hour, ten hours constituting the minimum course for beginners. Planes of various standard makes will be used in order that after instruction has been completed a student may fly any kind of plane he may be called upon to handle. A new flying school building later will be erected.

Instruction will be given by a special staff of pilots under the supervision of William John McDonough, air mail pilot and flying instructor. The chief flying instructor is C. D. Curtis, graduate of the U. S. Army Advance Flying School at Kelly Field.

For the private pilot's license twenty hours of flying instruction will be given in the school, inclusive of the hours of dual control instruction. Instruction includes tail spins, side slips, forward slips, approaches from various angles, dead stick landings and reverse turns.

Russell Chute Firm Grows

SAN DIEGO (CALIF.)—Growth of the Russell Parachute Company, which occupied less than 800 sq.ft. of floor space three years ago, to its present expansion of 10,000 sq.ft., is delineated in a report just made public by President H. R. McClintock. The Russell company is now engaged in producing several hundred Army type parachutes for the Government and in manufacturing its standard lobe type parachute for aircraft operators. McClintock further reported that the British Russell factory at London, England, also is operating to capacity.

Late Gardner Race Entries

ST. LOUIS (MO.)—As we go to press, the following additional pilots to those listed last week were entered in the Gardner Annual Trophy Race held at Parks Airport on Tuesday and Memorial Day: George Lea Lambert, son of Maj. Albert Bond Lambert, piloting a Curtiss-Robin from Denver; Willard King, piloting a Travel Air from Buffalo; James J. Mattern, a Cessna from San Antonio; Ellsworth Rogers, a Travel Air from San Antonio and Floyd Clymer, a Swallow from Denver.

American Glider Assn. Organized in California

LOS ANGELES (CALIF.)—With five Southern California Glider Clubs included as charter members, the American Glider Association was formed here at a meeting held the evening of May 22. Much interest is reported from other western states, with glider clubs at San Francisco, Calif., and Portland, Ore., already seeking admission in the new association, and it is hoped to make the organization a nation-wide institution. Charter members are: Los Angeles Glider Club, Los Angeles; South Bay Glider Club, Redondo; Jadson Glider Club, Bell; Rioco Glider Club, Hynes; and the Gardena Glider Club, Gardena. It is expected that the Long Beach Glider Club, the oldest in Southern California, will join the association at the next monthly meeting. Several dozen gliders have been built and are being flown constantly by the various club members. Windjammers, or dummy gliders for ground training, are also in use at each of the five clubs. In the near future it is planned to build one or more soaring type gliders of German type, and attempt to capture some of the records now held in Germany.

Officers of the American Glider Association are: Edwin Gettins, president; Wycliffe A. Hill, secretary; Hal G. Mors, treasurer, with one vice-president to be elected by each of the associated clubs and to act on a board of governors.

A. R. Eno Buys Iowa Airways Corp.

FT. DODGE (IA.)—A. R. Eno, Rockwell City contractor, has purchased the Iowa Airways Corporation of this city, the transfer including lease upon the Junior Chamber of Commerce Airport and all equipment of the Iowa Airways. Mr. Eno will establish an aviation school, service station and passenger lines to Des Moines and Sioux City. Mr. Eno already owns two planes and employs a full time pilot, and has been an aviation fan several years.

The purchase added two more planes, a Waco and a Curtiss, both in good condition, hangar and office building. Two new training machines and two cabin cruisers are to be added to the field fleet, the new owner announced. "Deac" Sherwood, Iowa Airways pilot, will be in charge of the school.

New Army Students Total 224

WASHINGTON (D. C.)—According to an announcement here, a total of 224 students will commence flying training on July 1 at the two primary flying schools of the Air Corps at Brooks Field, San Antonio, and March Field, Riverside, Calif. The State of Massachusetts claims the highest number of successful candidates with nineteen, followed by Illinois with seventeen, and California with 16.

New Firms Announced

LYNN HAYES AERO CORPORATION, Los Angeles, Calif.; capital $100,000; by Lynn Hayes and Lindsay Gillis, of Los Angeles, and Robert S. Osgood, of Pasadena.

DETROIT AERONAUTICS PRODUCTS COMPANY, 4151 St. Aubin Avenue, Detroit; Capital $25,000; to manufacture and deal in airplane accessories.

KEWANEE AIRPORTS, INC., Kewanee, Ill.; capital 600 shares no-par value stock; by Thomas C. Pierce, A. J. Anderson and R. R. Haley; to build 160-acre airport.

EASTERN FLYING CLUBS, Angola, N. Y.; capital 1,000 shares no-par value stock; by H. W. Barrett and others; to establish and operate a commercial service.

WESTERN AVIATION SUPPLY COMPANY, Oakland, Calif.; capital 50,000 shares of stock; by Donald McClure, Guy G. Gilchrist, E. A. Novak, M. Baker and H. E. Thompson and others, to deal in all kinds of aeronautical supplies.

BERKSHIRE AIRWAYS, INC., Great Barrington, Mass.; capital $25,000; by Robert K. Wheeler, J. H. Lansing and Frank J. Brothers.

GREAT EASTERN AIRWAYS, INC., Baltimore, Md.; by James T. Skinner, Burton G. Vardon and Bernard H. Dundon; to deal in aircraft.

FLEETWING, INC., Worcester, Mass.; by James P. Whittall, John D. Baldwin and Paul B. Morgan, Jr.; to deal in aircraft and equipment.

WESTERN AIR TRANSPORT COMPANY, Brighton, Col.; capital of $50,000; by P. Larrabee, Jr., S. P. Dun and G. Harris.

ILLINOIS AIRWAYS CORPORATION, Abington, Ill.; capital 50,000 shares no par value stock; G. S. Schugman, N. H. Stringfellow, and J. E. Stringfellow; to conduct an airport.

GENERAL AVIATION CORPORATION, Los Angeles, Calif.; capital 500,000 shares no par value stock; to acquire control of aviation enterprises and to buy, trade, or deal in aeronautic securities.

LONG ISLAND SEAPLANE AIR TERMINAL, INC., 52 Wall Street, New York City; capital 100 shares no par value stock; by Paul Van Anda, Frederick W. P. Bryan and Mary E. Ervin; to operate seaplane terminals and airports.

GLOVE CITY AIRWAYS, INC., 128 East State Street, Gloversville, N. Y.; capital $10.000; by Milton Roys, Mary N. Roys, and Huy W. Wilmot; to operate an airport.

AMERICAN AIR EXPRESS, INC., 120 Broadway, New York City; capital 10,000 shares preferred stock and 2,500 shares common no par value stock; by William R. Meagher, Walter A. Peterson and John W. Crandall; to operate aircraft.

G. M. C. Enters Diesel Field

INDIANAPOLIS (IND.)—That General Motors Corporation has acquired the Allison Engineering Company of this city, is announced here, with development of a Diesel aircraft engine stated to be in view. The Allison firm has been working on such a power plant, it is reported.

Fairchild Negotiating For Mid-West Factory

FARMINGDALE (L. I., N. Y.)—Negotiations for purchase of an established mid-western aircraft factory have been begun by the Fairchild Aviation Corporation, subsidiary of The Aviation Corporation, according to Sherman M. Fairchild, heading the firm bearing his name.

"We propose to buy a mid-western company which makes a ship intended for a different kind of air service than our present models," Mr. Fairchild said. "We shall continue acquiring additional types until our line of planes is complete."

Production at the Fairchild plant at Farmingdale, Long Island, has so increased that the company now has on its payroll more employees than ever before, Fairchild said.

Three years ago, the personnel numbered 9. At the end of 1927, there were 425 employees. Today, there are an even 800, exclusive of the staff of the Kreider-Reisner Aircraft Company, Inc., Hagerstown, Md., Fairchild subsidiary and maker of the "Challenger" sport and training biplane.

(Concluded from page 1883)

climb indicator, Smith air speed indicator, Splitdorf ignition switch, National Gage and Equipment Company oil and gas pressure gages, AC spark plugs, Stromberg carbureter, and Scintilla magnetos were employed. T P aviation gasoline and rocker arm lubricant was used, with 870 Amlo oil for the Whirlwind.

Phil Ball, president of Mahoney-Ryan, announces that a new Ryan Brougham will be presented to the airmen by his firm and by the Wright company, which is sending a J-6 Whirlwind to power the new craft.

Avians Equipped with Pioneers

BROOKLYN (N.Y.)—First production Avians of the Whittelsey firm will carry Pioneer instruments, it is announced here, as will also all planes of Great Lakes Aircraft Corporation and the New Standard Aircraft Corporation, The Kreutzer tri-engined Air Coach is also using these instruments.

Five More Sikorskys to P.A.A.

NEW YORK (N. Y.)—Five additional Sikorsky amphibion planes have been ordered by Pan American Airways for use on the Canal Zone-Colombia-Ecuador route operated by P.A.A. as subcontractors to Pan American Grace.

Announce Eaglerock Time Payment Method

COLORADO SPRINGS (COLO.)—A new finance plan for buying Eaglerock airplanes on time payments in announced by Justin A. McInaney, vice-president in charge of sales for the Alexander Aircraft Company here.

The new plan is made possible through the organization last week of the Airplane Acceptance Corporation, formed to finance Eaglerock sales. Stock in the corporation has been subscribed by prominent Colorado Springs financiers.

Under the terms of the plan, no insurance is required on the Eaglerock purchased. It is said that because of a low overhead enjoyed by the finance company, the interest and finance charges will amount to only 10 per cent of the unpaid balance. A 40 per cent down payment is asked.

The Eaglerock distributor making the sale does not have to make good the purchaser's note on unpaid balance. The usual chattel mortgage or conditional sales agreement is required on the plane purchased. The 60 per cent balance on the list price, plus 10 per cent finance charge on this unpaid balance, is payable in twenty semi-monthly installments.

Wedell-Williams Firm Buys Menefee Planes

NEW ORLEANS (LA.)—Menefee Airways, Inc., recently sold its five planes and other assets to the newly-formed Wedell-Williams Company, according to James Menefee, president. James Wedell, president of the new organization, has been chief pilot of the Menefee company since its establishment, nearly two years ago. Harry Williams, local lumberman, is vice-president. Other officials are: Edmund Denis, secretary-treasurer, William Wedell, flight instructor, and Charles Fortune, ground school instructor.

The Wedell-Williams company will fulfil all contracts of the Menefee organization. Additional planes are to be purchased shortly. The company will use the Menefee field, the lease for which was recently sold to the Southern Air Transport, Inc. It will represent the Lincoln-Page and Ryan companies. A flying school, and general passenger and other activities are being planned. Mr. Menefee declared that his company would not liquidate but would be active for some time.

Rich Helium Deposit Found

LOUISVILLE (KY.)—Discovery of a new helium deposit, which is believed to be the richest in the world, has been reported by Lieut. R. W. Bottom, director of research for the Helium Company. While he would not reveal its exact location, the deposit is thought to be somewhere in Kansas. The company now has a deposit near Dexter, Kan., which yields 2.4 per cent helium.

PERSONNEL

RICHARD C. LOUNSBURY, formerly of the Nazareth Cement Company, Philadelphia, is now in the traffic department of Pan American Airways, New York City.

ROBERT GREGG has been elected president of the Atlanta Aircraft Corporation. GEORGE H. PRUDDEN was elected vice president; EDWARD WHITEHEAD, vice president and secretary; and C. HOWARD CANDLER, N. B. WHITCOMB, S. CANDLER DOBBS, JR., HENRY C. HEINZ, WINSHIP NUNNALLY and N. BAXTER MADDOX, are members of the board of directors.

F. L. BARCHARD has resigned from the Swallow Airplane Company staff.

A. P. BARRETT, president of Southern Air Transport, and SHERMAN M. FAIRCHILD, president of Fairchild Aviation Corporation, have been elected vice presidents of The Aviation Corporation. ALEXANDER O. CUSHNY has been promoted to treasurer, following the resignation of D. K. E. Bruce.

FRANK S. HUBBARD, chief engineer of the Berliner-Joyce Aircraft Corporation, has been elected director.

WILLIS BARRON, formerly a salesman for the Robertson division of Universal Aviation Schools, has been appointed sales manager for the new Universal school at Cleveland.

GEORGE SAWALLESH, for some time in charge of aeronautical activities for the Wichita Chamber of Commerce, going to the Central Air Lines company less than a month ago as assistant to E. A. Watkins, president, has replaced NORMAN WARSINSKE as operations manager.

CHARLES LANDER, formerly operations manager for the Wichita Flying school, has been appointed manager of the school to fill the vacancy created by the resignation of SI R. DAGUE, who has left the school to devote all his time to organization of the Wichita School of Aviation.

FRED FOWLER of Ulysses, Kan., who a few months ago surprised his parents in western Kansas by landing his plane in their backyard, has been made chief pilot for Aeronautical Schools Association, Wichita.

H. J. HEINDELL has joined the aeronautical department of Valentine & Company with headquarters in New York.

CHARLES F. GOOB, chief engineer of Baltimore, has been elected a member of the aviation committee of the United States Chamber of Commerce.

MELVIN P. BICKLEY, former Cincinnati city passenger agent of the Big Four Railroad, has returned to Cincinnati as traveling passenger agent of the Southwest Air Fast Express to open a Cincinnati headquarters for the air transportation company.

CHARLES BLOSSER, formerly an American Eagle dealer in Belleville, Kan., has joined the district sales managers' force of the American Eagle Aircraft Corporation and has been assigned to the West Coast territory to assist H. E. Trotter, present district sales manager in California.

CHARLES BOETTCHER II, prominent Denver financier and broker, has been elected member of the board of directors of Alexander Industries, Inc.

WILLIAM E. PHELAN, representing the Aeronautics Branch, has been assigned to the American Eagle Aircraft Corporation's factory at Fairfax Airport, Kansas City, as Federal inspector.

LIEUT. CMDR. PAUL GILLESPIE, director of the Robertson division, Universal Flying Schools, has been elected president of the Robertson Aircraft Corporation, also a division of the Universal system, to succeed HARRY H. PERKINS, who has resigned.

Lieut. ROBERT B. WILLIAMS, France Field, has resigned from the Air Corps to become superintendent for Pan American Airways at Santiago, Chile.

Lieut. FREDERICK FUNSTON has resigned from the Air Corps to enter private business.

JOHN SQUIRES has been elected president of the Kreider-Reisner Aircraft Corporation. LEWIS E. REISNER has been elected vice president; F. E. SEILER, JR., vice president; HAROLD KONDOLF, treasurer; JOHN K. BAKER, JR., secretary. The directors include SHERMAN M. FAIRCHILD and EMMET W. GANS.

CHARLES HEDGER, Spokane, has been elected president of the Washington Airport Association. A. F. WEHE, Pasco, was elected secretary-treasurer, and vice presidents include I. J. GEHLEN, of Ellensburg; CAPT. DAVID LOGG, Seattle, ad D. M. MERRIN, Spokane. The legislative committee includes C. F. STINSON, Pasco; WILLIAM M. CONNORS, Seattle; L. L. BRUNNING, Colfax; and HARVE PHIPPS, Spokane.

CLOYD CLEVENGER is reported in St. Louis to have been appointed purchasing adviser for the Mexican Air Service.

R. S. MCKIM, formerly associated with the Curtiss company, has become affiliated with the Aeronautical Department of Valentine & Company.

BERT OLMSTEAD of South Bend, Ind., has been appointed manager of the municipal airport.

LIEUT. A. MCMILLAN, of the Colorado National Guard, has become a mail pilot for Western Air Express, on the Pueblo-Cheyenne route.

HOMER STOCKERT, of Fort Wayne, Ind., has been appointed chief flight instructor of the Shockley Flying Service, South Bend, Ind.

E. K. MERRITT, former chief demonstration pilot for the Stinson company, has been appointed pilot on the Detroit-Cleveland line of the Thompson Aeronautical Corporation, replacing RALPH DEVORE, recently promoted to the superintendency of the marine division of the Thompson concern.

LOUIS G. RANDALL, formerly management engineer, Inspection Division, of the Army Air Corps, has been appointed general factory manager of the New Standard Aircraft Corporation, Paterson, N. J.

FRANK A. MCKAY, formerly with the Kendall Refining Company of Bradsford, Pa., has been appointed operations manager and director of the Marshall Flying School, of the Nicholas Beazley Company.

USHER ROUSCH, Long Beach, Calif., has been appointed mail pilot on the Interstate Airlines.

JAMES A. TALBOT has been elected director of the Aero Corporation of California, Inc., Los Angeles.

LIEUT. DANIEL F. KEARNS has been appointed to the staff of the Aviation Corporation of America, Chicago.

Representatives Named

MOHAWK PINTO—Goldenberg's department store, Washington, D. C.; for District of Columbia, Virginia and Maryland.

EAGLEROCK—Aero Corporation of California; additional territory of New Mexico and Western Texas.

STINSON—Portland Airways, Inc., Swan Island; for Oregon and Vancouver, Wash.

ARROW SPORT—Fleetwing, Inc., for Worcester, Mass., section.

WACO—Greer Airways, 2024 South Wabash Avenue, Chicago.

CARDINAL—Culver City Airport, Inc., California; for the state of California.

WALLACE — Kempton-Dudley Flying Service, Janesville, Wis.

KEYSTONE LOENING "COMMUTER"—Thompson Aeronautical Corporation, Detroit.

BARLING—General Aviation Company, Syracuse, N. Y.

AERONAUTICAL CALENDAR

June 1-2	Southeastern Aeronautical Exposition, Macon, Ga.
June 3-15	All-Kansas Air Tour, starting and finishing at Witchita.
June 10-14	First Michigan Air Tour, Starting at Pontiac Municipal Airport.
June 27-29	Air Show, Schenectady, N.Y. Airport
June 27-30	International Light Plane Meet, Amsterdam, Holland.
July 16-27	International Aircraft Exhibition of the Society of British Aircraft Constructors, Olympia, London.
Aug. 24-Sept. 2	National Air Races and Aeronautical Show, Cleveland, Ohio
Aug. 26-28	Society of Automotive Engineers, Cleveland Aeronautic Meeting.
Sept. 2-7	Class C Aviation Exhibit Rochester Exposition at Rochester, N. Y.
Sept. 6-7	Schneider Cup Race, over the Solen Cowes, England.
Sept. 28	Gordon Bennett Balloon Trophy Race, St. Louis, Mo.
Oct. 12-27	Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Tex.
Dec. 1-9	International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago.

BRIEFLY

Colonial Airways System has received the first of a fleet of six Sikorsky amphibians to be used on the new Buffalo-Toronto line and other services.

Florida is reported to have had twenty airports in operation May 1.

The "Papoose," baby plane weighing only 300 lb. and powered with a 27-h.p. engine, is to be manufactured by the recently organized Osage Aircraft Company, Pawhuska, Okla.

The Irving Air Chute Company is reported to have reached a production of 100 chutes a week.

R. D. Ellis, 50-year-old Minneapolis pilot, is reported planning a flight from Minneapolis to Stockholm, Sweden, in a single-engined Bellanca about June 20.

The Aviation Service and Transport, Inc., Chicago, has added a department of aerial photography to its school.

Five airship pilots are to be trained in anticipation of the consummation of the plans of the Goodyear-Zeppelin Corporation to open a trans-Pacific air line within the next few years. The course will include one year in ground school training and another year in flight training, using the Goodyear blimps.

Allied Motor Industries, Inc., is reported in New York City financial circles to be negotiating for American Cirrus Engines, Inc.

The Endicott, N. Y., Airport will be dedicated June 8 and 9 by an air meet under the auspices of the Endicott Aero Club.

Universal Air Lines, which is surveying the Cleveland-St. Louis route for a passenger service, is planning to extend that line further to Omaha.

Following failure of the city of New York to provide funds for the repair of the Rockaway Naval Air Station, the Navy is to move the planes and equipment to Philadelphia.

Schenectady, N. Y., Airport has been chosen as the base for the Colonial Flying Service.

Student pilots at the Airtech Training School, San Diego, are reported to have flown 1,082 hr. since October 1 without an accident.

The remaining 2,000 communities out of 7,500, which have not complied with the Guggenheim plan to air-mark their community, are the object of a special appeal to the governors of the states for an early completion of the work.

Production will be started early next fall on the 130-hp. Comet radial engine at Madison, Wis., by the Comet Engine Corporation, identified with the Gisholt Machine Company. Rights in the engine were purchased from the California firm.

The first Bellanca seaplane, a six-place cabin machine, was tested recently on the Delaware River by Capt. George Haldeman, the company's chief test pilot.

A biplane capable of diving vertically with full power fo 10,000 ft. and able to release a 1,100 lb. while in the dive, has been delivered to the Naval Air Station at Anacostia by the Glenn Martin Company. It is the first product of the Baltimore Martin plant. The fuselage from the cockpit back is moncoque. Details of the machine are being withheld.

Reports of statements made by Henry Ford in a recent interview with President Hoover indicate that the Detroit auto manufacturer's airplane division is developing a Diesel engine for airplane power.

The average charge over the United States for air travel is 11 cents a mile according to the Boeing System Traffic Department.

Airways maps are now on sale at the Coast and Geodetic Survey Office in the Custom House, San Francisco.

T. B. Eastland and Walter S. Marvin have reached the Pacific Coast in the T.A.T. transport on their survey flight.

On May 20 about 12,000 letters were carried on the P.A.A. plane leaving Miami for Central American points.

An effort is being made to have Tampa, Fla., recognized as a federal airport of entry.

A one-place monoplane weighing 450 lb. has been built by Logan Nourse and Victor Leighton, Kansas City, Mo. Both are employees of the American Eagle Aircraft Corporation. The machine is powered with a 60 h.p. Anzani and in flight tests is said to have reached a top speed of more than 160 m.p.h.

David S. Ingalls, Assistant Secretary of the Navy for Aeronautics, has returned to Washington after an inspection tour by air, accompanied only by a mechanic.

Eight students recently enrolled for the Transport course in the Robertson Division, Universal Aviation Schools, and 23 in the Limited Commercial course.

Lieutenant Jamieson, director of the Interstate Flying Schools, has been making a survey of the Robertson Division, Universal Aviation Schools.

Harry E. Wimperis, director of Scientific Aviation Research in the British Air Ministry, and McKinnon Wood, head of the Aerodynamic Section of the Training Depot at Farnsborough, England, are expected to visit Buffalo's airplane manufacturing plants soon.

Victor J. Wallin, president of the Bolivia Gold Exploration Company of Denver, Los Angeles and Bolivia, and Carlos Rodriguez of Wichita, arrived in the latter city recently with a cargo of $30,000 in raw gold ingots with which to buy planes, the first order being a Travel Air.

The Army Air Corps recently contracted with the Aircraft Control Corporation of Philadelphia for 326 altimeters.

The Western Air Express recently took delivery of a Boeing six-seat flying boat which it will use for aerial tours of Catalina Island.

TRADE TIPS

It has been reported that

Proposals will be received until 10 a.m. June 4, by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., for delivering aircraft compass parts.

Runchey Brothers have purchased a tract at Madison, S. D., one mile west of the city limits, and will establish a landing field thereon, erect a hangar, service station, etc.

The Midwest Aviation Company, care of L. Enziniager, North Platte, Neb., plans establishing an airport east of Carter Lake, near Omaha, Neb., and will build a 100x100 ft. and 60x100 ft. hangar.

Boeing recently delivered the last of six model 95 mail-cargo planes for N.A.T.

A campaign is underway in Seattle to buy a fast plane to represent the city in the National Air Races event from Los Angeles to Cleveland.

Air mail is flown between Chicago and Cheyenne now without changing planes, although a new pilot takes over the machine at Omaha.

Night mail service in Pittsburgh and Cleveland was inaugurated May 22 by Clifford Ball.

Official representatives of the Persian Government are in this country now making a study of American aviation.

Rockford, Ill., is petitioning Northwest Airways officials to make that city a stop on its air mail route.

Buffalo is to have a fully equipped weather bureau station as soon after July 1st as equipment can be installed. It will be connected to the Airways System by the usual communication facilities.

Skagway, Alaska, is reported planning to build an airport. This field when completed will bring Alaska's airports and intermediate landing fields past the half-hundred mark.

St. Louis offices of the S.A.F.E. have been established in Room 1159 of the Syndicate Trust Building with M. V. Little in charge.

Shelton Air Transportation Company has secured a ten-year lease on the Shelton, Wash., Municipal Airport.

A bill has been introduced in the Florida Legislature calling for the establishment of landing fields throughout the state by the State Highway Department. The plan calls for landing strips about 1,500 ft. long and 150 ft. wide near the main highway.

Pilots who are to fly the Los Angeles-Kansas City division of Western Air Express are making practice flights over the route.

National Flying Schools, Inc., Buffalo, N. Y., is reported seeking hangar space at Milwaukee.

AIRPORTS AND AIRLINES

Hold Hearings On Proposed Airways

WASHINGTON (D. C.)—Advocates of a proposed airway between Pittsburgh and Norfolk by way of Baltimore and Washington, and between Pittsburgh and New York by way of Philadelphia appeared at a hearing by the Inter-Departmental Committee on Airways here May 22. Representatives of the various cities involved explained the value of the airways. One claim was that the shipping interests at Norfolk desire an air mail outlet to the West.

John Bonforte, representing Colonial Airways System of New York City, declared that these routes were not needed as much as a transcontinental route and urged the establishment of one between Washington, D. C., and points on the Pacific Coast by way of Cincinnati and Dallas, Tex. This scheme was said to have the backing of the Baltimore & Ohio Railroad which wishes to establish an air-rail system.

An air mail route from Richmond or Greensboro to Jacksonville by way of Winston-Salem, High Point, Raleigh, Columbia, Augusta, Charleston and Savannah, was urged before the committee on airways by members of Congress and business leaders from those sections on May 23.

Congressman Urge Routes

Senators Harris and George of Georgia spoke in behalf of the cities of Savannah and Augusta. Congressman Pou of North Carolina, speaking for the city of Raleigh, pointed out that there are already three airports in operation in that city. Congressman Edwards of Georgia stated that Savannah has an airport of 740 acres.

The question of a direct air mail hook-up between Portland, Seattle, Spokane and Tacoma with the transcontinental air mail system at Salt Lake City was discussed at a hearing May 24. Senator Wesley L. Jones of Washington, read a letter from the Spokane Chamber of Commerce, advocating the establishment of an extension to that city of the existing route running from Salt Lake to Pasco, Wash.

The proposal for the establishment of a new air mail route from Louisville, Ky., to Dallas, Tex., will be considered on June 12. The route to be considered runs from Louisville via Nashville and Memphis, Tenn., Little Rock and Texarkana, Ark., to Dallas, and Fort Worth, Tex. In addition, the committee will consider the question of establishing three connecting spur routes, one from Nashville to Birmingham; one from St. Louis to Memphis, and another from Little Rock to Shreveport.

Form Trans-Atlantic Firm

PORTLAND (ME.)—For the purpose of seriously developing an intercontinental air service, the Great Atlantic Airways has been organized here. The capital stock is $200,000 and F. V. Mann of this city is president. The company would link this city and Stockholm, Sweden, via Belle Isle Strait, Greenland, Iceland, Faroe Islands and Oslo, Norway.

Southern Skylines Plans New Routes

CINCINNATI (OHIO)—This city is scheduled to be an important point on two air lines proposed by Southern Skylines, Inc., a new company which plans to operate a southern transcontinental and Atlantic coastal air-rail service. Word of the project was received May 21 from Washington. William G. McAdoo, former treasury secretary, is chairman of the board.

The company is contemplating a service from New York to St. Louis with stops at Cincinnati, Indianapolis, Dayton, Columbus and Pittsburgh. It is also planning a line from Chicago to New Orleans which would have a connection from Cincinnati to Dallas, it was said. James C. Edgerton, air mail pilot, is to be vice president and general manager.

The contemplated transcontinental service would be on a 48-hour schedule, serving Philadelphia, Washington, Danville, Va., Atlanta, Birmingham, Jackson, Miss., Shreveport, Dallas, Fort Worth, Midland, Tex., El Paso, Phoenix and San Diego. The company plans to build its own planes, it was stated.

P. A. A. Ends Venezuela Survey

WASHINGTON (D.C.)—The final survey flight and organization plans for early inauguration of a regular service between this country and Maracay, Venezuela, by way of the Canal Zone and various points in Colombia and Venezuela, have been completed by Pan American Airways, Inc. It is planned to extend the line eventually to Dutch Guiana.

Open Consolidated Ticket Office

KANSAS CITY (KAN.)—A consolidated ticket office for all scheduled air lines and air taxi operators throughout the country has been opened at the Midland Building here under the the auspices of the Aviation Club of Kansas City with Clarence R. Mooney in charge. The bureau will have information on European services as well.

Grosvenor Field to Be Big Commercial School

SAN ANTONIO (TEX.)—All-year-'round training for pupils in its aviation schools everywhere in the country will be provided by the Aviation Corporation, $200,000,000 holding and development company, at a large airport soon to be established here.

Acquisition by Southern Air Transport, Inc., subsidiary of the Aviation Corporation, of a 406-acre tract of land for this airdrome is announced. Five miles from the San Antonio metropolitan district, the property lies between Kelly Field, famous Army schooling center, and Winburn Field, the San Antonio municipal airport. It has been named Grosvenor Field in honor of Graham B. Grovenor, the Aviation Corporation president.

"Students in Aviation Corporation flying schools in those sections of the country where climate hampers year-'round training will be sent to Grosvenor Field during the winter months so that their pursuit of flying knowledge and experience may continue without interruption," said Tom Hardin, Southern Air Transport vice-president and general manager. It is hoped to make Grosvenor Field the Kelly Field of commercial aviation.

Mail Rates to Be Lowered, Says Brown

WASHINGTON (D. C.)—On account of the wide difference between the earnings of air mail and its cost to the government and because of the wide differences in remuneration to the air mail contractors, a revision in the rates now in effect between the government and the several companies must be made, Postmaster General Walter Brown told the conference of air mail contractors here May 27.

He declared that the government is not trying to drive a hard bargain and expressed the wish to see the air mail services prosper. The conference decided that the Post Office Department should prepare a questionnaire to be submitted to all the operators to determine operating costs and other salient factors involved in the transportation of air mail. Mr. Brown suggested that operators be paid on a mileage or distance basis. Under the present contracts some are carrying mail for $.78 a lb. while others get $3 a lb. Under the law the contracts run for from four to six years.

The government reported it is paying $1,000,000 a month for air mail, one-tenth of the entire postal outlay.

P.A.A. to Install Huge Radio System

NEW YORK (N. Y.)—A $1,000,000 radio system serving 7,500 mi. of airways through West Indies, Mexico and Central and South America and involving a total of 72 stations—ten of which are in operation now and eight more are being built—has been announced by Pan American Airways. Using wave lengths of 54.9 meters and 124.9 meters allocated by the Department of Commerce, the company will set up in connection with the Radio Corporation of America what is described as the triple communication system.

This consists of a radio telephone for instantaneous communication between planes and ground stations, radio telegraph routine messages and an automatic signal set which registers a simple series of dots and dashes as a course indicator. Sixteen planes are already completely equipped, according to J. T. Trippe, president and general manager of the company. The balance of the fleet of 60 machines will be outfitted soon with the 100-watt combination sets, which have a 600-mi. range for the telegraph and 200-mi. range for the radiophone. Each plane will be a completely equipped station and licensed radio operators will be carried as a regular member of each plane's crew. Under this system each plane in the air will be in constant touch with at least two ground stations.

Maddux Opens New Line

LOS ANGELES (CALIF.)—Maddux Air Lines, opened a new service from Alameda Airport, San Francisco Bay, to the new Monterey Peninsula Air Terminal serving Monteray, Del Monte, Pebble Beach, and Carmel, on Saturday, May 25. Ford planes will leave Monterey daily at 9:00 a.m., arriving at Alameda airport at 10:10 a.m. Leaving Alameda at 4:30 p.m. planes will reach Monterey at 5:40 p.m. Connections will be made with all southbound Maddux planes from the Alameda terminal.

H. H. Robertson to Build Hangars

PITTSBURGH (PA.)—A contract for the construction of six hangars for Pan American Airways in Central America has been awarded the H. H. Robertson Company of this city. Material to be used will be special protected steel covering for both walls and roofs, the same as supplied by the company for hangars in several Carribean countries. Each hangar will be 120x120 ft. with a 120x20 ft. lean-to.

Start Colonial Toronto Line Soon

BUFFALO (N.Y.) — Inauguration of the Colonial Airways System's service between here and Toronto is scheduled for early in June, according to Gen. John F. O'Ryan, president of the concern, while here recently completing arrangements for the line.

Will Use Magnet To Clean Up Field

EL PASO (TEX.)—As the municipal airport here has a great many pieces of wire and nails on it — airplane tire hazards—all of them are to be "picked" from the large tract, before oiling is started. For the purpose of removing this metal, the nail picking machine of Col. H. R. Andrews of New Mexico, has been borrowed. This device consists of a giant magnet. When driven over the ground all the metal particles cling to it readily.

Mid-Continent Will Serve Western States

WICHITA (KAN.)—Early in June Wichita will be served by another air mail, express and passenger line, according to P. H. Philbin, Jr., general manager of the newly formed Mid-Continent Air Express. Lou Holland, president of the Kansas City Chamber of Commerce, is interested in the new line.

Passengers, express and probably air mail are to be carried between cities of Kansas, Colorado, New Mexico and Texas, according to Philbin. Cities on the Mid-Continent line will include Wichita, Kansas City, Mo., Dodge City, Garden City and Syracuse in Kansas; Pueblo, Colorado Springs, Denver, Trinidad, Wasenburg, La Junta and Lamar in Colorado; Albuquerque, Las Vegas and Raton in New Mexico, and El Paso in Texas.

The new line will make Wichita and Kansas City important air mail junction points with lines serving in different directions. It will cross the trail of National Air Transport, Inc., pioneer air mail line of the Southwest. Harris M. Hanshue, president of the Fokker Aircraft Corporation of America, is president of the Mid-Continent concern. James A. Talbot, chairman of the Fokker board is a director.

Airvia Plans Coastal Lines

NEW YORK (N.Y.)—Airvia Transportation Company here has announced plans for a coastwise two-hour service between this city and Boston and a ten-hour service between here and southern resorts, during the winter only. The company has ordered three of the double hulled, fourteen place Savoia Marchetti flying boats for the service from the American Aeronautical Corporation. The Boston line is to be started in July.

Northwest Routes Attracting Operators

PORTLAND (ORE.)—At least three companies are expected to bid on the three new air mail lines projected by the Post Office Department to merge into the Pasco, Wash.-Salt Lake City branch of the transcontinental at Pasco. Completion of plans for the lines has just been announced by W. Irving Glover, assistant postmaster general.

The new branches, as outlined in press dispatches from Washington, D. C., would be: Portland-Pasco, Seattle-Pasco and Spokane-Pasco. The Portland-Pasco and Spokane-Pasco lines could conveniently be tied up into a Portland-Spokane route with Pasco as its center station.

Varney Air Lines, present contractor on the Pasco-Salt Lake line, is a certain bidder on at least the Portland and Spokane branches, and probably will enter a bid on all three lines. It has already laid plans for Portland-Salt Lake City airplane passenger service with tri-engined Fokkers starting about August 1. It had expected to obtain the extension to Portland through the Columbia gorge as an addition to its present contract, according to statements made by officials prior to the Post Office Department announcement.

Mamer Air Transport, which recently opened a daily air service between Portland, Yakima, Wash., and Spokane, is also expected to try for the contract. It is a subsidiary of Mamer Flying service of Spokane. The third almost certain bidder is the Bruning Eaglerock organizations of Portland and Spokane. L. L. Bruning is head of the companies which are now engaged in an exhaustive survey of the route between the two cities with the idea of establishing a commercial line.

There is also a possibility that a fourth organization would seek to enter the field. Boeing Air Transport, operator of Pacific Air Transport and the western lap of the transcontinental, may offer a bid. Either Boeing or Varney would be able to start the service on short notice, it was said.

R. C. A. Will Light Towers

NEW BRUNSWICK (N.J.) — The Radio Corporation of America is to light the company's radio towers here. This action follows government requests that they be lighted to eliminate the hazard for mail pilots in the vicinity of Hadley Field. During the period of delay between the requests and the decision of the radio interests, it was decided by the Federal Radio Commission that it had no authority to enforce radio stations to paint and illuminate towers near the airways.

T.A.T. Get Western Office

LOS ANGELES (CALIF.) — Temporary western traffic headquarters for the T. A. T. have been established with the Curtiss Flying Service in the Pacific Mutual Building in this city.

Many Airport Projects Progress

More Developments Reported In Country

Following a survey for the development of Candler Field, Atlanta, Ga., the city council has authorized the improvements which will make the tract a high grade airport. The recommendations were made by William F. Centerer of the Aeronautics Branch. The east-and-west runway will be 2,640 ft. long and the others will be 2,600 ft. long. Area is provided also for extension of the north-and-south runway by an additional 1,200 ft.

Work will be started soon on the construction of a 700-acre airport at Greensburg, 22 mi. from Pittsburgh. About $1,000,000 will be spent on the project, it is said, which includes two 3,000 ft. runways. Directors of the project are Maurice R. Scharff, Samuel E. Dieschner, Frank Wilbur Main, Byron C. Hepler, S. Leo Ruslander and M. C. Monick, all of Pittsburgh.

About $50,000 will be spent by the Curtiss Flying Service for hangars, class rooms, club house and other accommodations at the Denver Union Airport, Denver, Colo. Work is being completed on a 2,000 ft. macadam runway at the new 360-acre Curtiss Airport, Valley Stream, N. Y. A temporary steel hangar, 100x120 ft. is being erected. Ultimate plans include a hotel, restaurant and twelve permanent hangars, as well as administration buildings.

Shreveport Votes Fund

Shreveport, La., has voted a bond issue of $300,000 for the construction of a municipal airport, the site of which has not been definitely determined. The Arizona Flying Service plans to establish an airport at Phoenix, Ariz., costing $260,000 and to include two 60x250 ft., hangars. Contracts will be let soon for the $275,000 drainage project for Lambert-St. Louis field. Two pieces of land totalling about five acres have been added for $6,200.

Boeing Air Transport has bought a site on Lake Washington for the development of a flying boat base on the proposed Seattle-Alaska passenger service and other flying activities. The Boeing company has also given the Austin Company of Cleveland, a contract to build a $75,000 100x200 ft. hangar at Boeing Field, Seattle. This will be the northern base for Pacific Air Transport, a Boeing subsidiary, according to reports.

Denver's Municipal Airport is expected to be ready for use by July 15. The 640-acre tract is being graded, one hangar is being built and the administration building is underway while contract for lighting the field has been let. The state's option on Lowry Field at Denver expired May 16 although the state has a tenancy of five more years.

Wichita's new 640-acre municipal airport and new hangar, capable of housing 30 average sized planes, is expected to be ready soon after June 1, in plenty of time for the inauguration later on the T.A.T. transcontinental service. Part of the new hangar is to be used by T.A.T. as a temporary passenger station. Southern Air Transport is planning to spend $250,000 in a development program at Mobile, Ala.

Leo. F. Caproni & Co., is building a 100x100 ft. hangar, machine shop, office and storeroom at Bethany Field, Bethany, Conn., for Harris Whittemore, Jr., of Naugatuck, Conn. It will cost about $20,000. Trees are being cut down and grading is underway at the new Consolidated Airport on Military Road, Buffalo, N. Y. It is being prepared for the use of Consolidated Aircraft Corporation.

Colonial Plans Newark Station

Colonial Airways has leased 200,000 additional square feet on the Newark, N. J., airport for the construction of a union air station costing $95,000. Construction will start at once. Construction has started on two paved runways at the Alexander Airport, Colorado Springs, Colo. These will be 4,200 ft. long. A new hangar is to be built at the Alexander field very soon. Civic clubs in Athol and Orange, Mass., are sponsoring the construction of an airport in Orange. An additional subscription of $22,000 was raised recently for the completion of the landing field at Gardner, Mass.

Aldermen of St. Louis, Mo., recently flew to Chicago to inspect the municipal airport there. The New York Air Terminals, Inc., which is developing the huge airport at Secaucus meadows, New Jersey, has added a tract of 27 acres to the 800 already in its control. The Santa Rosa, Calif., Municipal Airport was opened recently with an aerial circus and exhibition. More than 10,000 attended the dedication of the Fullerton, Calif. airport. Enough money was raised by admissions to buy 28 additional acres. The Selma, Ala., Municipal Airport will be dedicated late in June.

The Raleigh, N. C., Curtiss Airport will be dedicated on July 4. The dedication of the Bradford, Pa., Airport July 6 will be marked by an air meet on that day and on July 8. An extensive program of races and stunt flying has been worked out. It will be held in conjunction with the American Legion Convention and a Shrine ceremonial. The Monterey, Calif., Municipal Airport which is about completed and will soon be opened for traffic.

Seek to Co-ordinate Lines

NEW YORK (N.Y.)—The Aviation Corporation and its operating subsidiaries have recently completed here a series of conferences on co-ordinating the various air line systems they are operating. The corporation now controls about 5,800 mi. of air mail and passenger lines.

Crosley Buys Field For Airplane Plant

CINCINNATI (OHIO)—That actual building operations will start in the near future of units in the airplane factory announced by Powel Crosley, Jr., a few weeks ago when the Crosley "Moonbeam" was launched, is indicated by a statement issued here today telling of the purchase of 193 acres of land at Sharon by the radio leader. This land, located on the north side of Sharon Avenue, between Sharon and Glendale, adjoins the right-of-way of the C., C., C. & St. L. Railroad, and it is proposed that the first factory unit and hangar will be erected on this portion. The rest of the ground will be converted into a mammoth test and landing field.

The new site is practically level and almost square, thus permitting the laying out of three runways each 3,500 ft. in length. It is expected that Powel Crosley, Jr., will make farther announcement about the factory units to be erected at Sharon upon his return to Cincinnati. As he recently announced the appointment of M. O. Griffith, formerly McCook and Wright Field power expert, as chief engineer of the engine division of the airplane company, it is expected that part of the new factory will be devoted to the development of engines.

Survey Florida For Lights

JACKSONVILLE (FLA.)—James Ray, operating manager of the Pitcairn Aviation Company, and W. S. Kenyon, airways extension superintendent of commerce, left here May 17, for Miami to survey the route in an effort to determine the most advantageous points for the erection of beacon lights, with a view of inaugurating night air mail service between Miami and Atlanta. A. P. Kerr, Florida manager of the Pitcairn Company, said that this night air mail, if installed, probably would supplant the day service now in force, although there is a possibility of a double schedule.

River Front Port for St. Louis

ST. LOUIS (MO.)—A detailed plan for development of the Mississippi River front north of the Merchants' Bridge soon to be made public by the City Plan Commission, includes arrangements for a new airport, according to Harland Bartholomew, consulting engineer for the commission. He said the city could build a mile-square airport in the district which would be only 15 min. drive from the downtown business district.

Sell Mail Stamps in Contest

JACKSONVILLE (FLA.)—A contest recently was sponsored by the local Junior Chamber of Commerce among school children of the city, with cash prize awards for those selling the highest number of air mail stamps during the week.

T.A.C. Makes Change In Lake Erie Service

DETROIT (MICH.)—Beginning May 27 the first trip of the four daily trips made between Detroit and Cleveland by the Thompson Aeronautical Corporation, operators of the Detroit-Cleveland passenger amphibion line, is made at 10 a.m., instead of 8.30 a.m., as has been the case, R. C. (Tex.) Marshall, vice-president and general manager of the corporation, announces.

Another change in schedule announced by Mr. Marshall, is that instead of operating two ships each way on Sunday, there will be no trips on Sundays or holidays, the planes being held in reserve on those days for sightseeing and taxi work. Since the Thompson lake line went into operation May 14, the company has operated simultaneous flights between the two cities daily at 8:30 a.m., 12:30 noon, 3 p.m., and 5 p.m. On Sundays flights have been at 8:30 a.m. and 5 p.m., each way.

Yellow Cab Line Cuts Schedule

MINNEAPOLIS (MINN.) — Yellow Cab Airways, Inc., operating airplane passenger service between Minneapolis, Des Moines and Kansas City, have announced a reduction of one-half hour in the flying time for the line. The new schedule is as follows: northbound, leave Kansas City at 8 a.m., arrive at Des Moines at 10 a.m. and Minneapolis at 12:30 p.m.; southbound, leave Minneapolis at 2 p.m., arrive at Des Moines at 4:30 p.m. and Kansas City at 6:30 p.m.

W.A.E. Reports Year's Record

LOS ANGELES (CALIF.)—May 23 marked the first anniversary of the Los Angeles-San Francisco air line operated by the Western Air Express. A report covering the year's activities shows that planes have flown 304, 662 mi. over this route, and have carried 3,038 paid passengers without injury of any sort to planes, pilots, or passengers, and with an on time record of better than 99 per cent.

Names Field For New Route

BINGHAMTON (N. Y.) — Colonial Western Airways, Inc., will make the landing field at West Endicott, 10 mi. west of here, a stop on that company's proposed new direct route from Buffalo to New York, if Federal authorities give their official sanction to the new service, said John F. O'Ryan, president, after inspecting the field May 15.

Pacific Firm Again to Patrol

OAKLAND (CALIF.)—Pacific Coast Air Service, Oakland Airport, has again been awarded the contract for the summer patroling of the California forests. Last year this company was credited with saving thousands of acres of timberland.

Balloons Warn of Movie Quiet Zone

HOLLYWOOD (CALIF.)—Through an agreement between the Aeronautics Branch, the California Aircraft Operators' Association, and motion-picture producers here, a quiet air zone has been established. A captive balloon, to which is attached a streamer with red flags hanging from it, serves as a signal to all aircraft that sound pictures are being made. At night lights will be attached to the balloon.

To Pick Up Leviathan Mail

NEW YORK (N. Y.)—The Burnelli-Chapman monoplane will meet the "Leviathan" June 7 on its next westward trip and attempt to pick up mail by means of a device invented by Dr. L. S. Adams of Seattle. The device will be placed on the top of a 40-ft. steel platform in the stern of the steamship. The plane will lower a cable on the end of which is a ball. The platform is surmounted by canvas grooves to guide this ball into a steel cup where a snap-lock device holds the mail to be picked up. The ship will be met 600 mi. out, according to the plans.

Plan Golden Jubilee of Light

NEW YORK (N.Y.)—The 50th anniversary of light—which is finding its latest expression through the medium of aeronautical beacons, floodlights and other aids to aviation—is to be celebrated this year with a golden jubilee. The high points will be in June when the National Electric Light Association meets in Atlantic City, and October 21, when the birthday of the first practicable incandescent lamp is celebrated at Dearborn, Mich.

Mexico Air Mail Gains One Day

SAN FRANCISCO (CALIF.)—Transit time for air mail between Oakland-San Francisco and Mexico City is two and one-half days, since the new Omaha-Kansas City route began operation, Boeing System officials announce. The new schedule saves one business day between the Bay Region and the Mexican capital. The air mail goes by way of Omaha, Kansas City, Fort Worth, Brownsville, and Tampico.

Sells Luft Hansa Tickets

NEW YORK (N.Y.)—It has been announced at the office of the Hamburg-American Line here that a contract has been made with the German Luft Hansa for the sale here of tickets for European flights.

Chapman Expects To Use Ocean Airliners

NEW YORK (N. Y.)—In a recent interview in a local newspaper Paul W. Chapman, head of the United States Lines, Inc., repeated his expectation of providing sometime trans-Atlantic airplane service in co-operation with the surface vessels which the company is now operating. A prominent part in these air plans will be played by the Chapman airliner developed by Vincent Burnelli, he says. This plane has been undergoing a long series of tests and Mr. Chapman reports confidence in its ability to meet the requirements and serve as the model of a Chapman air fleet.

He declared again the company's intention to provide inland passenger air service to travelers on the company's steamships who wish to reach points in the interior of this country in a hurry. He declared one of the reasons for buying the United States Lines was the belief that the airplane travel could be made a very important component of the general transportation system.

Continental Express Adds Fokker

LOS ANGELES (CALIF.)—Fast service between this city, Taft, and Bakersfield has been augmented recently by the addition of a tri-engined Fokker F-7 to this route. The new service, operated by Continental Air Express, of this city, makes it possible to leave here daily at 8:30 a.m., arrive at Taft at 9:40 a.m., and Bakersfield at 10:00 a.m. Returning, the plane leaves Bakersfield at 4:30 p.m. and arrives here at 6:00 p.m., after making one stop en route at Taft.

Proposes Air-Rail System

EL PASO (TEX.)—A new transcontinental air-rail system connecting Los Angeles and the Middle West is to be put into operation, according to Earl Halliburton, as part of the Southwest Air Fast Express. The plan involves plane service from St. Louis to Midland or Sweetwater, Tex., and train service to El Paso, where passengers would board planes for Los Angeles.

Select Phillipine Port Sites

NEW YORY (N.Y.)—Press reports here state that the Army has selected 16 airport sites in the Phillipine Islands, declaring them military reservations in order to hold them against the time that commercial aviation in that territory will need them. The sites have been selected, it is said, with a view to future commercial operations.

To Operate Bus From Airport

OAKLAND (CALIF.)—W. B. Green, of the Oakland Airport Transport Service, has been given permission to operate a bus service between the local municipal airport and downtown hotels to connect with scheduled planes.

FOREIGN ACTIVITIES

English Firm Selects Spartan and Bluebird

LONDON (ENGLAND) — The Simmonds Spartan and the Blackburn Bluebird IV light planes have been adopted by National Flying Services, Ltd., as the nucleus of its fleet of training and touring planes to be stationed at its various centers throughout the country. The machines will be powered by the Cirrus III air-cooled engine of 85 hp.

It is reported that the choice of the Spartan and Bluebird was not founded on any general superiority which these machines may possess over their rivals, but on their particular suitability for the company's work. The Spartan was chosen for its excellent qualities as a training machine, robust construction and interchangeability of its component parts, while the Bluebird was selected for its side-by-side seating arrangement and advanced system of metal construction.

Capt. T. Neville Stack, formerly chief pilot of A.D.C. Aircraft, Ltd., at Croyden, has been appointed chief pilot of the new company and will have charge of all flying operations. There will be a total of 34 pilots and 54 planes of mixed types when the system is in full effect.

National Flying Services has been appointed British representatives and consultants and sole agents to the Union Airways, Ltd., of South Africa. This latter company has concluded a contract with the Union Government in South Africa for a subsidy for the transportation of air mail between Cape Town, Port Elizabeth, Bloomfontein and Johannesburg, and also between Port Elizabeth, East London and Durban.

A system similar to that of National Flying Services is being considered there and close co-operation between the two is expected. Tentative arrangements have been concluded by National Flying Services to act as agents and representatives of a number of other companies which have been formed or are being organized in different parts of the Empire.

New Canadian Clubs Formed

OTTAWA (QUE.)—Eight new flying clubs have been organized in the Dominion, bringing the total of these organizations to 24. About $140,000 will be spent by the government this year in grants to the clubs, each of the new clubs receiving two planes. At present there are 142 holders of private licenses and 45 of commercial licenses in the clubs, the total membership being 8,400 with 260 of these flying solo.

English Build Cabin Fighter

LONDON (ENGLAND)—The Royal Air Force has been reported in the press as having developed a new type of fighting plane, the chief characteristic of which is a cabin for the pilot rather than the open cockpit. The cabin is of non-splinterable glass treated to prevent it from frosting over in high altitudes, and giving excellent visibility. The idea of this cabin is to protect the pilot from exposure, particularly at extreme altitudes in which fighting planes have to operate, and thus produce greater efficiency in the pilot. It is claimed that this protection was inspired by the apparent freedom from fatigue displayed by Colonel Lindbergh after the ordeal of his trans-Atlantic flight.

Italian Light Planes Selected

ROME (ITALY)—Following the recent government tests to select the most suitable light plane for flying clubs in this country the following have been chosen: the Fiat AS-1 with the Fiat A-50 radial engine of 50-90 hp.; the Macchi M-70 powered with the Colombo four-cylinder in-line engine of 90 hp.; and the Breda 15, powered by the same engine. An order for 50 of the Fiat machines has been placed. The actual winner of the competition was the Caproni company but as its plane was powered with the English DH Gipsy engine it was not selected for use.

Fix Cause of Graf Failure

FRIEDRICHSHAFEN (GERMANY.)—Breaking of the crankshafts due to the long sustained oscillation of the crankshaft is blamed for the failure of four engines on the Graf Zeppelin on its recent attempt to cross the Atlantic. Repairs are being made rapidly and it is expected that the trip may be resumed soon. The accident, forcing a landing on French soil as it did, is being regarded by both French and Germans as one of the best things that could have happened for amity between the two countries.

Germans Study Ocean Flying

BERLIN (GERMANY)—Pilots are being qualified in this country for long distance flights and trans-Atlantic service by the Luft Hansa. Fifteen more pilots have just passed examinations in seamanship and deep-sea navigation, bringing the total so qualified to 34.

Canadians Form Air Chamber

MONTREAL (QUE.)—The Canadian Aeronautical Chamber of Commerce has been organized by about 35 representatives of aircraft concerns.

Europeans Claim Three New Records

BERLIN (GERMANY)—A new altitude record is being claimed by Willy Neunhofer, a Junkers pilot, following a flight in which his altimeter is said to have registered 41,795 ft. If calibration of the instrument proves that this height is correct, the Germans will have beaten the mark recently set by Lieut. Apollo Soucek, U. S. N., who reached 39,140 ft. on May 8.

The machine used was of the same type as the Bremen and carried no load. On a previous attempt Neunhofer lost consciousness when his oxygen tube burst at about 35,000 ft. The machine fell to within two miles of the earth before he regained consciousness and control of the plane, landing safely.

In Paris Commandants Weiss and Girier, are said to have broken the world speed record for the distance of 5,000 km. (about 3,125 mi.) by covering the distance at an average speed of about 112 m.p.h., or 180 km. an hour. The former mark was made by the Italians, Ferrarin and Del Prete, at an average speed of 139 km. per hour.

Paris reports, also, a French pilot by the name of Lemoigne on May 24 flew a plane loaded with 1,000 lb., to an altitude of about 31,500 ft., thus establishing what is believed to be a world altitude record with that load. A previous record in this class was held by the German, Schinzinger, with a mark of about 30,000 ft.

Foreign News Briefs

About 25 planes are expected to take part in the air pageant at Moncton, N. B., July 1 and 2. Several planes are expected from the eastern part of the United States.

Thirty-five nations were represented at the Sanitary Aviation Congress at Paris, May 14 to 20. The English and French are planning extensive medical and ambulance services by air in various parts of their respective domains.

It is expected that fully 12,000 will occupy reserved seats at the Tenth Royal Air Force Display at Hendon, Saturday, July 13, in England. At least 100,000 people are expected to view the display from inclosures inside the aerodrome.

Flight Lieut. d'Arcy Greig, head of the British Schneider Trophy Team, may be out of the race on account of an injury to his eye received when he struck his head against the exhaust pipe of his automobile while making repairs.

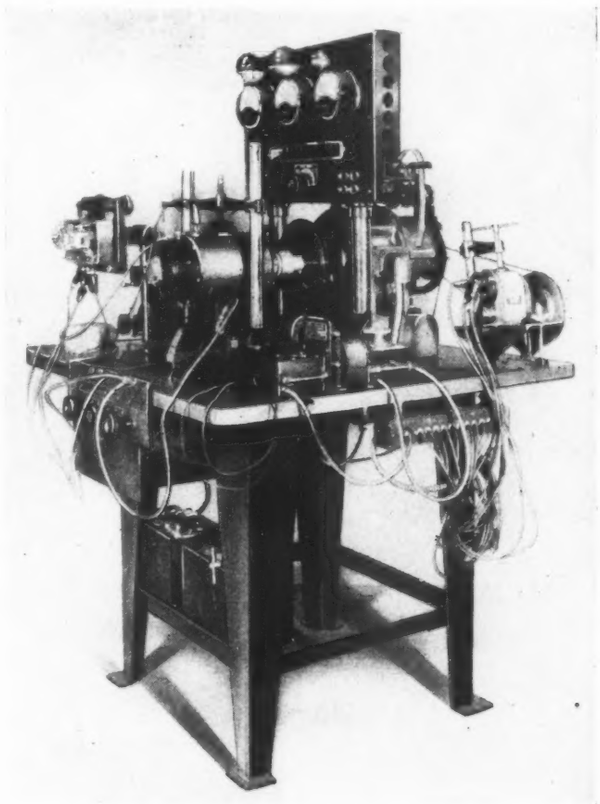
Tampico, Mexico, is to be a port of entry for the Mexican Government and passports of air passengers from this country will be examined there.

THE BUYER'S LOG BOOK

B. & R. Electric Test Bench

TO MAKE special tests on the electrical equipment of airplanes and automobiles, it is necessary to have a complete bench capable of testing generators, starting motors, distributors, coils, cut-outs, condensers, voltage regulators and magnetos.

The new B & R Model A bench is manufactured by Burton & Rogers Manufacturing Co., 857 Boylston Street, Boston, Mass., and has the motor placed at the rear of the bench so that the whole front is available for other testing or repair apparatus. The meters are large 5 in. instruments of ample range for any kind of test.



A front quarter view of the B. & R. test bench

Special fixtures handle magnetos and voltage regulators while the other units needing attention are taken care of in the standard vise integral with the test unit.

Power is furnished by a 3½ hp. G.E. motor of the brush shifting type, reversible and with a speed range of 4,000 r.p.m. in either direction. This motor will hold a speed as low as 100 to 150 r.p.m. and is, therefore, adjustable for slow and high speed operating tests.

The B & R single adjustment vise and flexible rubber coupling are employed on this bench to give the straight line drive feature which has been used on other B & R test units. This method of clamping and drive enables the operator to line up his work in a minimum of time, eliminates all noise and wearing metal parts and insures positive action with no possibility of danger to the operator or to the unit being tested. The panel is equipped with three switchboard-type 5 in. dia. meters and a specially designed adjustable 12 point spark gap. Instruments include an ammeter, voltmeter and tachometer.

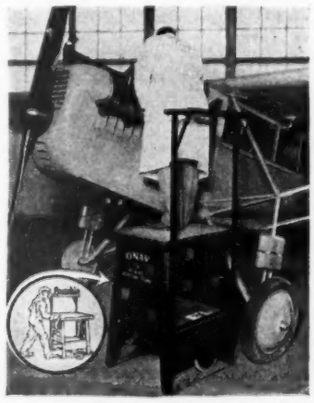
A specially constructed bracket for holding all types of voltage regulators is part of the equipment of this unit. A special vise for holding magnetos, speed adjusting pulleys and 12 built in high tension leads are furnished for magneto testing, making it possible to drive magnetos at any speed from as low as 20 r.p.m. on up.

A coil testing bracket is furnished, equipped with an attachment for testing magneto armatures. A set of breaker-points is built in for duplicating operating conditions when making coil tests. A condenser is also built in this same circuit and can be used or not at the option of the operator, according to the style of coil to be tested. Separate condenser tests are provided for by making it possible in this construction to substitute outside condensers for the panel condenser.

Special attachments are furnished for driving all types of generators and making starter torque tests. Additional units include a B & R model IA armature reconditioning tool for commutator turning and undercutting, and the B & R model GA growler for armature testing and a 9 in. rotary spark gap.

Airplane Inspection Stand

A PORTABLE inspection and repair stand for airplane hangars and repair shops has been developed and is now offered for sale by the D. W. Onan & Sons, 43 Royalston Ave., Minneapolis, Minn. The stand can be moved from one plane to another and facilitates such operations as engine repairing, filling and painting. It also saves damage to the plane from careless climbing on landing gear struts and other portions of the aircraft.



The Portable Inspection Stand made by D. W. Onan & Sons

Foot holes are provided to facilitate mounting the stand and a rubber covered flooring is furnished. A high table for tools is built on the staid and prevents the operator from stepping off backward. A 24 in. by 28 in. tool space is provided below the table. The height of the stand is 38 in., the width 24 in. and the length 32 in., while the height of the table from the ground is 60 in. The shipping weight of this equipment is 200 lb.

Thickness Gage Stock in Rolls

THE L. S. Starrett Company, Athol, Mass., announces thickness gage or "Feeler" stock in a new and handy form for production operations where certain thickness or thicknesses are in constant use. The No. 666 Starrett thickness gage stock comes in 25 ft. rolls, ½ in. wide, and in thicknesses from 0.0015 to 0.015 in., packed in dirt protecting metal cases.

The No. 666 Starrett thickness gage stock is spring tempered to insure accuracy and dependability and marked every six inches with a line, the thickness and the name Starrett. It has the decided advantage in that if the "feeler" stock becomes bent or kinked from use, the damaged part is cut off and the work continued.

Used in a Starrett Thickness Holder No. 806, which holds any thickness from 0.0015 to 0.025, the last bit can be utilized and no chance of cut fingers. It is especially useful for checking gear play, spark plugs, valve clearances, fitting pistons or any place where certain thicknesses are in constant use.

Black & Decker Holesaw

A HOLESAW designed especially for use in the installation of exhaust heaters in automobiles and airplanes has been developed by the Black & Decker Manufacturing Co., Towson, Md. This type of saw is furnished in sizes ranging from ¾ in. to 3½ in. and is designed to operate in any Black & Decker portable electric drill having a capacity of ½ in. or more. A number of other uses will be found for this tool in the hangar or machine shop.

SIDE SLIPS

By
Robert R. Osborn

WITH so many aviation mergers announced in the papers each week, we have been expecting the few companies which are still unattached to come out with announcements similar to the one we saw on a restaurant in downtown New York,—"On and after June first this restaurant will be under the same management."

• • •

We see by the papers that a new airplane service is to be started in Panama, which will be named the "Trans-isthmian Airways." As the talking pictures have brought out so many actor heroes who have unheroic lisps, we'd suggest the use of the name of this new airways company as a test by casting directors. If the actor pro-

nounces the test sentence as, "Yeth, my thweetheart, that ith a Tranthithmian Airwayth plane" we suggest that he be cast for some part other than that of the hard-boiled, wild west, cowboy hero.

• • •

A friend of ours dropped in the office the other day, on his return from a flying trip to some of the out-of-the-way places in West Virginia and he claims that the state has some of the wildest flying country he has ever struck. Claims he had to make

all landings up hill and keep full power on until he could get some chocks in back of the wheels. Says one field was so steep the engine couldn't hold the ship on the ground and he went out of it backward in a whipstall. Claimed that safety belts and bank-and-turn indicators were standard equipment on all cars in that state. He also added at the end of his discussion that the moonshine in the back hills was unusually powerful and of excellent quality, which, considering the rest of his story, we were beginning to suspect must have been the case.

• • •

Judging by the number of cities and countries in which Colonel Lindbergh is going to be married, according to the newspapers, he and Miss Morrow must be planning another good-will tour as extensive as his last one.

• • •

A news item states that the Dornier works in Germany is planning to build some twelve-engined flying boats capable of carrying 80 passengers at 200 m.p.h. "The huge ships will virtually be hotels of the air, offering restaurants, reading rooms, promenades and other features associated with land structures." One "feature associated with land structures" which we are sure the passengers would appreciate, at least the sea-sick ones, would be a section of solid, non-rolling land.

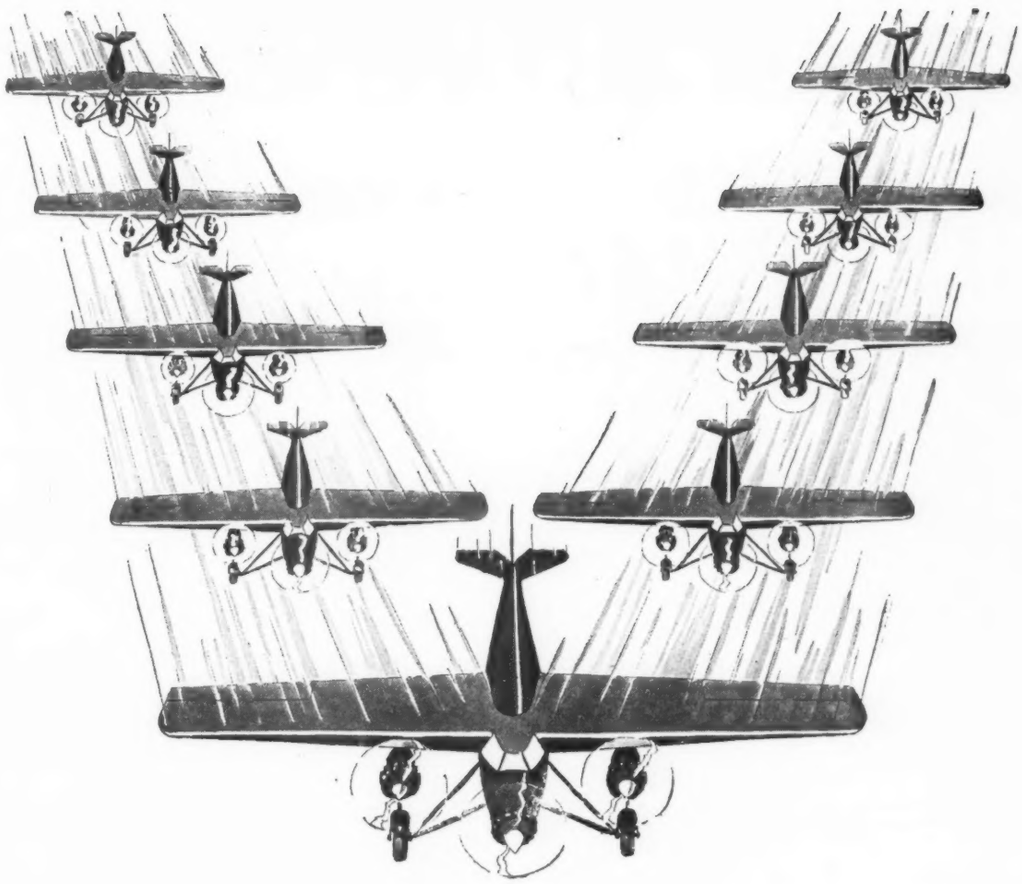
• • •

A newspaper item mentions another plane which needed a thousand "years" run to take off with a heavy load. We suggest the name "Spirit of Abie's Irish Rose" as an appropriate name for a plane with a run as long as that.

• • •

You may remember that the Society for the Aeronautical Education of Artists, having done so much good work in teaching artists what an airplane should look like, had turned their attention to brokers in the Stock Market, who had begun to make some startling statements about the aero-

nautical projects they were backing. We hope to have our work in this field in good shape to turn over to some one else shortly, as the advertising copy writers seem to be in urgent need of help. From a full page advertisement in a recent issue of the New York *Times* we quote: "A quick smooth take-off, plus a remarkably *staple* air performance, to a perfect three-point landing."—and later: "The split-axle undercarriage with its unusually wide *tract*."



Get your planes into the air quicker

IN order to get your share of the business these days you must deliver *on time.* The new Aeronautical Department of Valentine and Company will help iron out the wrinkle that has caused you no end of delav and trouble—The Finishing Problem.

The Valentine Aeronautical Department is eminently equipped to render a very real service. No theoretic or hypothetic advice. Skilled technical men are prepared to go into your paint shops and work out a finishing system adapted to your particular needs and based upon that modern model of finishing efficiency,—the Airplane Nitro-Valspar System.

Airplane Nitro-Valspar is the outgrowth of combining Valentine wearing quality and beauty with the speed demanded in the aircraft field. A demonstration will prove that we have succeeded. Write for further information to any one of the offices listed below.

VALENTINE & COMPANY
AERONAUTICAL DEPARTMENT
386 Fourth Avenue, New York, N. Y.

CHICAGO: 2500 Prairie Avenue
DETROIT: 10-254 General Motors Bldg.
BOSTON: 49 Purchase Street

KANSAS to NEW YORK

The Take Off for Siberia from the Snowfields at Nome

PATRONS ARE REQUESTED TO FAVOR THE COMPANY BY CRITICISM AND SUGGESTION CONCERNING ITS SERVICE 1901-B

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable sign above or preceding the address.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT J. C. WILLEVER, FIRST VICE-PRESIDENT

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WARNER AIRCRAFT CO=
DETROIT MICH=

IN OVER TEN THOUSAND MILES FLYING FROM DETROIT TO NOME THEN SIBERIA AND RETURN TO NEWYORK SCARAB MOTOR FUNCTIONED PERFECTLY STOP MAINTENANCE FOR ENTIRE TRIP CONSISTED OF GREASING ROCKER ARMS AND OILING VALVE STEMS SIX TIMES ADJUSTING CLEARANCE ON TWO VALVES AND CLEANING ONE PLUG STOP THANKS FOR THE BUILT IN RELIABILITY=

PARKER D CRAMER.

VIA SIBERIA

10,000-mile amazing WARNER-SCARAB performance

ARRIVAL AT NOME, ALASKA,
APRIL 23, 1929

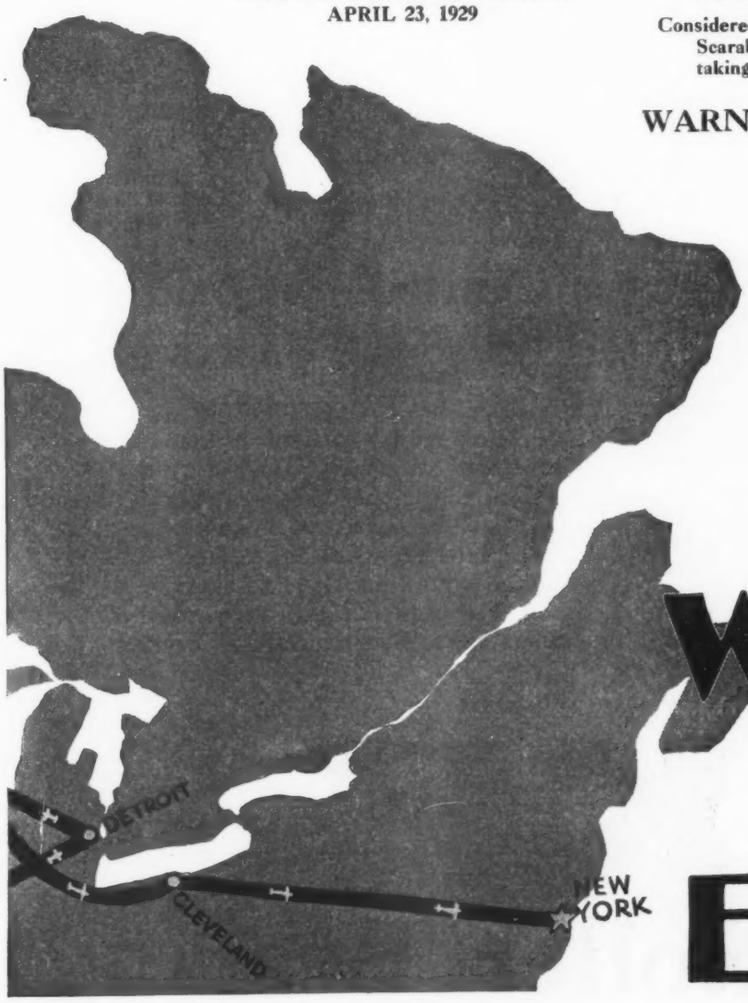
One month to the day on which he left Detroit, Parker D. Cramer was again in that city after the amazing 10,000-mile flight of his Warner-Scarab to Siberia.

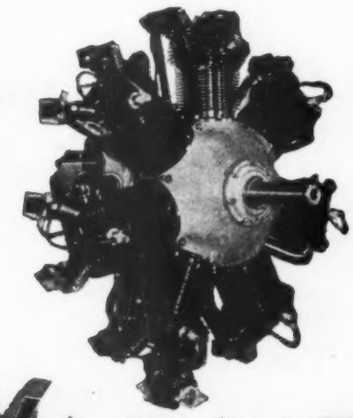
Using the same plane and the same engine (No. 26) with which Earl Rowland won the New York to Los Angeles Air Derby last September, and flying 1400 miles a day when necessary, Cramer made the trip in 118 flying hours with only the slight adjustments to the engine mentioned in the telegram herein reproduced. And the return flight, Nome to New York, was made in 46 hours' flying time.

During the flight all climatic conditions were encountered, beginning with the almost mid-summer temperature in Kansas, the starting point, through the balmy spring air of Alberta, and into the zero weather of Alaska and Siberia.

Considered from every viewpoint, this most recent Warner-Scarab performance is a magnificent tribute to the painstaking care and skill used in the engine's production.

WARNER AIRCRAFT CORPORATION
DETROIT, MICHIGAN





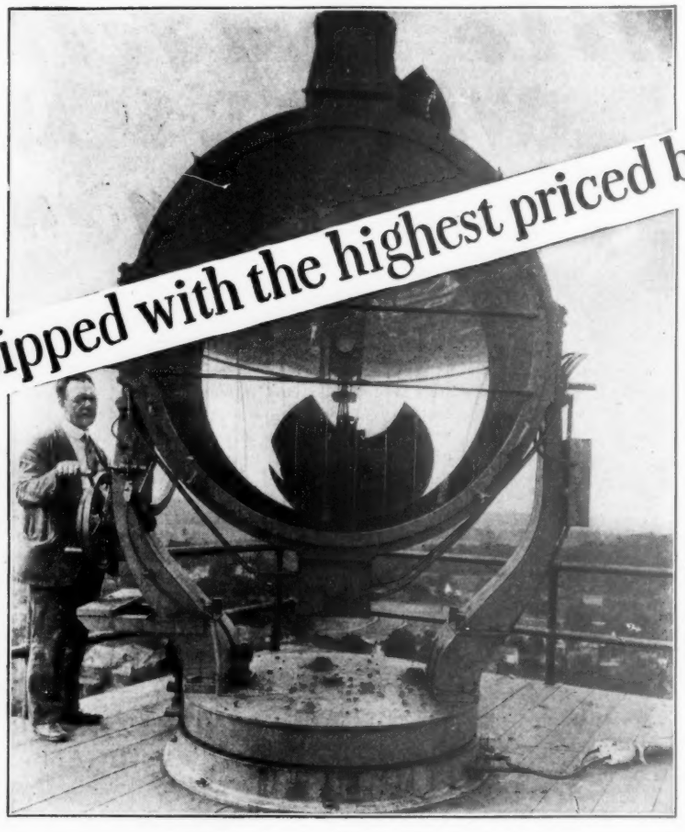
WARNER

THE Scarab

ENGINES

ANOTHER ONE OF THE 65 MANUFACTURERS IN THE AVIATION INDUSTRY THAT USES SKF BEARINGS

Sperry Gyroscope Company



Equipped with the highest priced bearing in the world

YOU MAY BUY A BEARING AS A BARGAIN BUT TRY AND GET A BARGAIN OUT OF USING IT

for

Nothing is apt to cost so much as a bearing that cost so little.

SKF Puts the Right Bearing in the Right Place

A Touch of the Finger Controls World's Largest Beacon Mounted on SKF Bearings

So well is the weight of the world's largest airplane beacon balanced that it can be controlled almost with the touch of a finger. This gigantic searchlight known as "The Jefferson Light," and installed atop the Charlottesville Hotel, Charlottesville, Va., was built by the Sperry Gyroscope Company and is fully equipped with SKF Ball Bearings.

Air riders of the night are safely guided by the powerful beam of 1,280,000,000 candles which pierces the sky from this beacon. The reflecting mirror is sixty-two inches in diameter. The lamp can be trained 360 degrees in azimuth and its beam can be directed vertically into the air. Unfailing dependability, smooth operation and freedom from close attention, these were the things placed above all considerations in the choice of SKF Bearings.

SKF INDUSTRIES, INC., 40 East 34th Street, New York, N. Y. 2290

SKF

Ball and Roller Bearings

PILOT and passenger in an hour's flight on less than four gallons of fuel—90 miles for $1.80—two cents a mile. *Amazing—and true* of the Aeromarine Klemm AKL25. Designed originally as a glider—powered by its perfectly adapted Salmson 40-50 horse power, nine-cylinder, radial, air-cooled engine—there are sound reasons back of this astounding economy of operation. Although some planes have to be dragged through the air, the AKL25 literally flies itself . . . reducing resistance to a minimum. Private owners will appreciate this, and for the flying school operator the above cost figures mean an actual saving of 30% over the average of standard competition during instruction flights. Add the plane's maneuverability, ease of control and the ruggedness of sound engineering—and you know why the AKL25 is repeating its European popularity—why in America it has become the favorite light plane for private ownership and the training of pilots. The AKL25 bears the Department of Commerce Approved Type Certificate No. 121.

AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. 44TH ST. & B'WAY, NEW YORK

KREIDER-REISNER

The high performance Fairchild KR 3¼A, a three place biplane, formerly the Kreider-Reisner "Challenger" C 4A.

OFF the ground quicker! Faster climbing! Higher speed in the air! This has always been the reputation of Kreider-Reisner planes. Careful engineering has made them light, with no sacrifice of strength and ruggedness. They are used extensively where fields are small and rough —where performance counts. They are adapted to this service, and need a minimum of repair.

STANDARD equipment on Kreider-Reisner planes includes many instruments and accessories not ordinarily found: airspeed, altimeter, compass, tachometer, oil-pressure gauge, temperature gauge and gasoline gauge. Other items of standard equipment include a booster starter, dual controls, radiator shutters (for water-cooled engines), cockpit covers, engine covers (for air-cooled engines only), tie-down ropes, tools, log book, first-aid kit and fire extinguishers.

IN addition, the front cockpit is also piped for the installation of an oil-pressure gauge and in the case of the **KR21**, oil-pressure and oil-temperature gauges are installed in the front cockpit. The wings of the **KR34** and **KR21** are wired for navigation lights. Wheel brakes are standard equipment on the **KR34** and can be had as extra equipment on the **KR21**.

PERFORMANCE AND SPECIFICATIONS

MODEL	KR31	KR34A	KR34C	KR21B	KR21A
ENGINE	Curtiss OX-5	Comet	Wright	Warner	Kinner
H. P. and R. P. M.	90/1400	130/1825	165/2000	110/1825	90/1810
Seating Capacity (Inc. Pilot)	3	3	3	2	2
High Speed (M. P. H.)	102	120	130	120	120
Rate of Climb Full Load (F. P. M.)	548	615	886	800	800
Service Ceiling (Ft.)	12000	16500	17000	7000	17000
Wing Loading (Lbs. per Sq. Ft.)	7	8.4	8.4	8.02	8.02
Power Loading (Lbs. per H. P.)	23	18.4	14.5	14.1	17.2
Weight Empty (Lbs.)	1200	1330	1435	964	950
Disposable Load (Lbs.)	878	1070	965	586	600
Gross Weight (Lbs.)	2078	2400	2400	1550	1550
Gasoline Capacity (Gals.)	33	50	50	23	23
Oil Capacity (Gals.)	4	4	4	3	3
Length Over All	23'–9"	23'–2"	23'–5"	22'–7"	22'–1"
Span	30'–1"	30'–0"	30'–0"	27'–0"	27'–0"
Wing Area (Inc. Ailerons, Sq. Ft.)	296	285	285	193	193
Aileron Area (Sq. Ft.)	30	36	36	17½	17½

now a unit of

FAIRCHILD AVIATION *Corporation*

Presenting a line of high-performance biplanes

IN keeping with Fairchild Aviation's policy of offering a plane for every purpose, Fairchild has acquired the Kreider-Reisner Aircraft Co. and, to the line of Fairchild cabin monoplanes built at Farmingdale, has added a line of Fairchild high-performance biplanes manufactured at Hagerstown, Maryland.

In acquiring Kreider-Reisner, Fairchild obtains a product famous for performance—biplanes that have been through two years' testing in service and of which more than 200 are now flying.

To this already established and well-organized company, Fairchild brings new financial resources and nation-wide sales and service facilities. Fairchild engineering and research will insure that Kreider-Reisner biplanes will be still further improved and will be in the future, as in the past, leaders in performance and dependability.

One of the immediate results of this acquisition is the construction of a large new plant at Hagerstown, Md., equipped with most modern machinery and employing many methods and processes exclusive to Kreider-Reisner and Fairchild. This expansion is necessitated by the demand for these high-performance biplanes, which already means an increase in production for 1929 of nearly five times that of 1928.

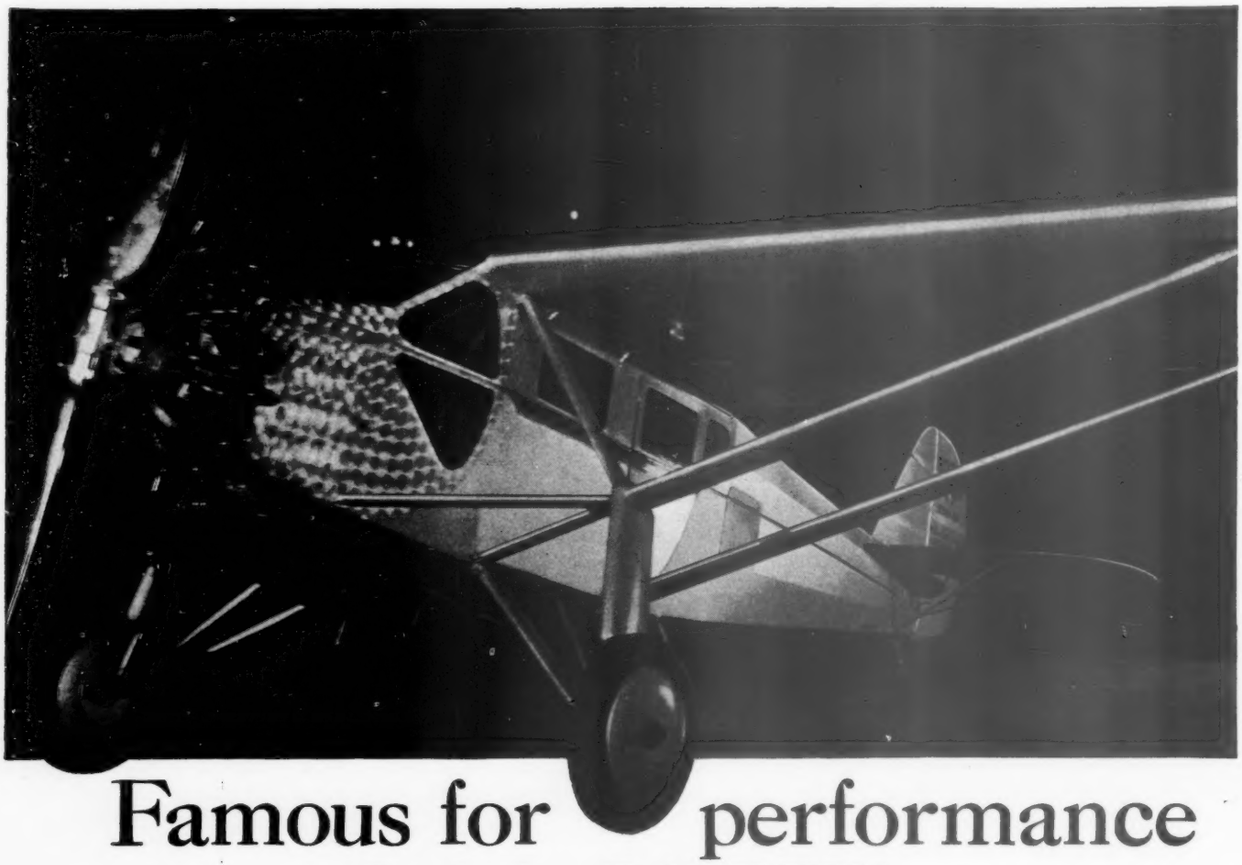
This latest move of Fairchild means to operators and pilots a product improved over even the fine Kreider-Reisner biplanes of the past. It means an extension of the fine service to owners which is a consistent standard in all Fairchild divisions.

To dealers it means a greater profit opportunity. These high-performance biplanes will be distributed through Fairchild sales organization with factory centers of sales and service at Farmingdale, Hagerstown, Chicago, Dallas and Los Angeles.

Sport fliers, pilots, operators, business houses and dealers should find it to their interest to know more about Fairchild biplanes. Address your inquiries to Fairchild Airplane Mfg. Corp., Farmingdale, L. I., or to nearest district office. 332 S. Michigan Ave., Chicago; 2102 N. Harwood Ave., Dallas; 228½ E. 11th St., Los Angeles; and in Canada: Fairchild Aircraft Limited, 505 Confederation Bldg., Montreal, P. Q.

FAIRCHILD

AIRPLANES



Famous for performance

Built for SAFETY!

You don't have to be a Lindbergh to judge the exceptional air-worthiness of the Ryan. One inspection tells you that here is no fair weather ship, but a craft engineered to withstand the unexpected stress and strain of dirty weather.

You see it in the Ryan's externally-braced wing construction—the strongest known. Its superiority to other types is readily apparent when you consider the heavier pay loads ships must carry today. Furthermore, it permits adjustments to compensate warping, which are impossible in the cantilever type wing.

You see it in the exclusive Ryan designed chassis with axle of Chrome Molybdenum steel tubing—the landing gear that stood up under the terrific shock of two and one-half tons weight on the take-off of the historic Paris flight. A landing carriage that will stand the gaff when you hit the dirt of the roughest fields.

You will see it, too, in the braces through the center of the Ryan's cabin. No other ship offers this safeguard to passengers and plane against the racking strain of rough landings. It adds materially to the life of the ship. And if the fabric were removed, you could see it again in the steel-tubing fuselage, master-welded at the joints and braced against torque and strain by diagonal steel members. Such *plus* construction characterizes the Ryan from spinner cap to rudder. It makes the world's most famous ship the safest, too.

Take-off with load
8 seconds, 275 ft.
Climb, 1200 ft. per min.
Top Speed, 140 m. p. h.
Cruising Speed
120 m. p. h.
Service Ceiling
18,000 ft.
Absolute Ceiling (light)
25,000 ft.
Landing Speed
50 m. p. h.
(Lands within a 200-ft. circle)
Department of Commerce Approved Type Certificate No. 142

As to performance, the whole world knows what the Ryan can do. Here (at left) are a few details which "Red" Harrigan, at the factory, or any Ryan distributor, will gladly demonstrate.

Send for new, illustrated catalog of the new Ryan Brougham for six, powered by the Wright Whirlwind J-6 engine. Mahoney Ryan Aircraft Corporation, Lambert-St. Louis Airport, Anglum, St. Louis County, Missouri.

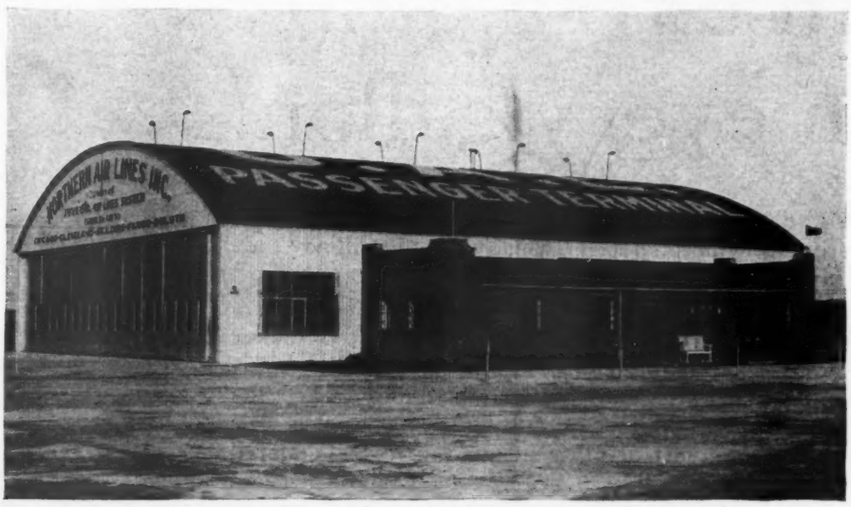
The New Model

· RYAN ·

Brougham For Six

SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

Building a hangar? Planning an airfield? Facing any airport problem?



A model hangar at Minneapolis on which Robertson materials were used.

Come to ROBERTSON

LET'S not make any unavoidable mistakes. There is so much yet to be done in this aviation industry . . . so many claims upon every penny of available capital . . . that none of us is justified in repeating experiments that have already failed, or in making mistakes that cost money.

Take hangars, for instance. So many things have already been proven about them that there is no need to make costly experiments. There is no use, for example, to take a chance on unprotected metal roofing or siding for hangars. Do what you will, they will rust away.

There is no use, on the other hand, to sink thousands of dollars into "heavy construction." It costs too much, and moreover it is a dead loss if ever you want to make any changes in your field. For another thing, there is no use ignoring the need for natural daylighting in hangars.

These and hundreds of other problems have been met and solved. The Robertson engineers have participated in all manner of trials and experiments in hangar construction all over the world since before the birth of modern commercial aviation. They know the answers to most of the questions. Let them look over your plans. Their suggestions will cost you nothing and will not obligate you. Just send your blueprints or plans to

H. H. ROBERTSON CO. · PITTSBURGH

ROBERTSON

WORLD WIDE BUILDING SERVICE

ROBERTSON *Has the Experience*

Here, thee finds an extra quart in every gallon!

THEE may have observed containers of Quaker State Aero Oil, without special curiosity. Yet it will pay thee to investigate their contents.

It is oil that is *all lubricant*—and in this fact differs materially from ordinary oils. For the makers of Quaker State Aero have developed a special process—*super*-refining—an extra step beyond the point where the refiner ordinarily leaves off. By this process there is removed the quart or more of non-lubricating material—of little or no value to thy motor—which is present in each gallon of ordinary oil. Thus, in Quaker State Aero thee obatins *four* full quarts of lubricant—in truth, an *extra* quart.

Furthermore, Quaker State Aero is refined exclusively from 100% pure Pennsylvania Grade Crude, whose superior quality makes it cost two to three times as much as the crudes from which most oils are refined.

Thus, every drop of Quaker State Aero is the finest lubricant which Man and Nature together have devised for the protection of thy motor. Thee will find, through one filling of this excellent oil, that these words are not idly spoken. Test their truthfulness in thy next flight!

More than 500 distributing warehouses, and 80,000 dealers, have been established in the United States and Canada, to enable thee to obtain Quaker State Aero on all thy journeys. Profit thereby!

QUAKER STATE AERO OIL

QUAKER STATE OIL REFINING CO.
Oil City, Pa.

Guaranteed 100% PURE PENNSYLVANIA OIL
The highest grade oil in the world

Other pure Pennsylvania products are:

QUAKER STATE MEDIUM MOTOR OIL
QUAKER STATE HEAVY MOTOR OIL
QUAKER STATE COLD TEST OIL
QUAKER STATE TRACTOR OILS

ROBIN PERFORMANCE·

▲ ▲WHAT THEY SAY ABOUT THE ROBIN

FORT WORTH, TEXAS

"Just a note to tell you how delighted we are with our Robin. I came through St. Louis via Muskogee, Oklahoma, Dallas and into Fort Worth in seven hours and twenty minutes, with a head wind the last two hundred and fifty miles. My average speed for this trip was right around ninety-five miles an hour.

I believe the Robin trims up and flies hands off better and with less attention than any airplane I have ever flown. If anybody wants to know about the Robin 'ASK US.'"

(Name on request)

EASE OF CONTROL AND INSTRUCTION

The Robin manoeuvres easily. Its operation is part of student instruction at any Curtiss Flying School. In the quiet closed cabin conversation can be carried on in a normal tone making instruction doubly effective.

▲ ▲WHY THEY SAY IT

Superior engineering design alone is responsible for the unmatched Robin performance—the same staff of engineers, that has made Curtiss military planes famous for 19 years, designed the Robin *for you.*

"—WORLD'S OLDEST FLYING ORGANIZATION"

CURTISS FLYING SERVICE

Sole Sales Agents for CURTISS-ROBERTSON AIRPLANE MFG. CO.

CURTISS AEROPLANE AND MOTOR CO., INCORPORATED
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CESSNA AIRCRAFT CO.
IRELAND AIRCRAFT, INC.
COMMAND-AIRE, INC.

27 WEST 57th STREET, NEW YORK CITY

THANK YOU *for mentioning* AVIATION

The Black

MOTOR

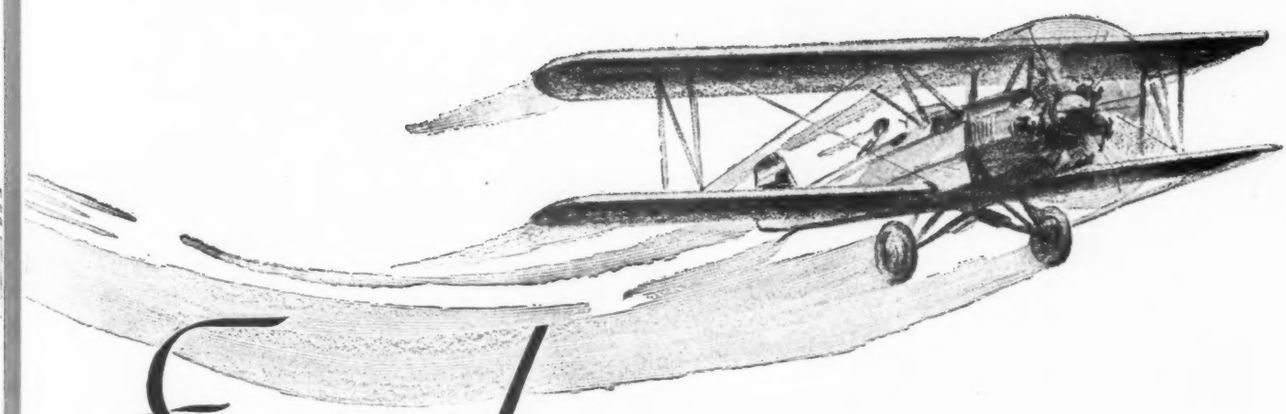
Approved by U. S. Dept. of Commerce Type Certificate No. 16

Rated horsepower at sea level—150. Bore—4.5". Stroke—5.5. Compression Ratio—5 to 1. Piston Displacement, cubic inches—612.15. Revolutions per minute—1800. Weight—450 lbs. Fuel consumption, cruising speed, pounds per h.p.—.5. Oil consumption, cruising speed, pounds per h.p.—.016.

FREE as the air it commands—poised and sure as the bird it honors—unlimited in range as the broad horizon, the Black Eagle soars to Supremacy of the Skies.

You who have yet to experience the fleet, smooth flight of COMMAND-AIRE'S flowing lines—who have yet to glory in the tremendous power, compactness, positive control, and sense of snug security in this trim, stable, graceful ship powered by Axelson—you indeed have yet to thrill at what sound engineering has done convincingly, for the advancement of aviation.

For, in this splendid combination of correct plane construction (embracing 10 cardinal points of exclusive development) and



Eagle soars . . .

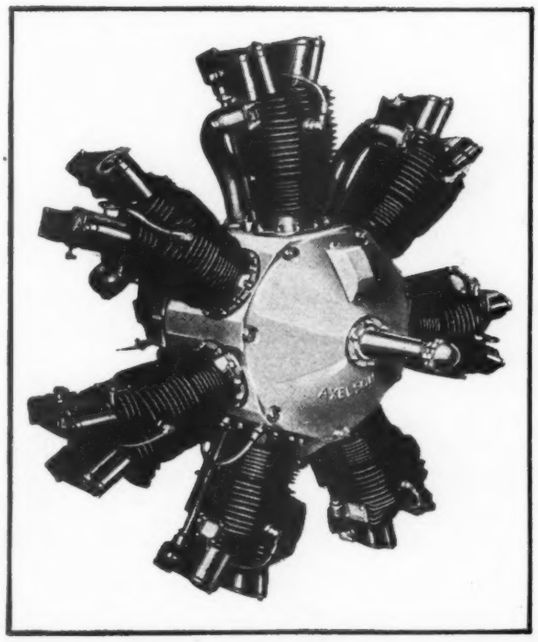
the super-power of Axelson's sturdy 7-cylinder, static, radial, air-cooled engine, COMMAND-AIRE contributes a brilliant new achievement among 3-place open type ships.

To you who judge by specifications, we will furnish an impressive catalogue. But first let the Black Eagle convince you by inspiring flight, with what skilled craft this catalogue has been synchronized into the sweetest ship aloft.

To arrange for a demonstration and secure complete literature and specifications, write either address below.

AXELSON MACHINE CO.
Los Angeles, California

COMMAND-AIRE, Inc.
Little Rock, Arkansas



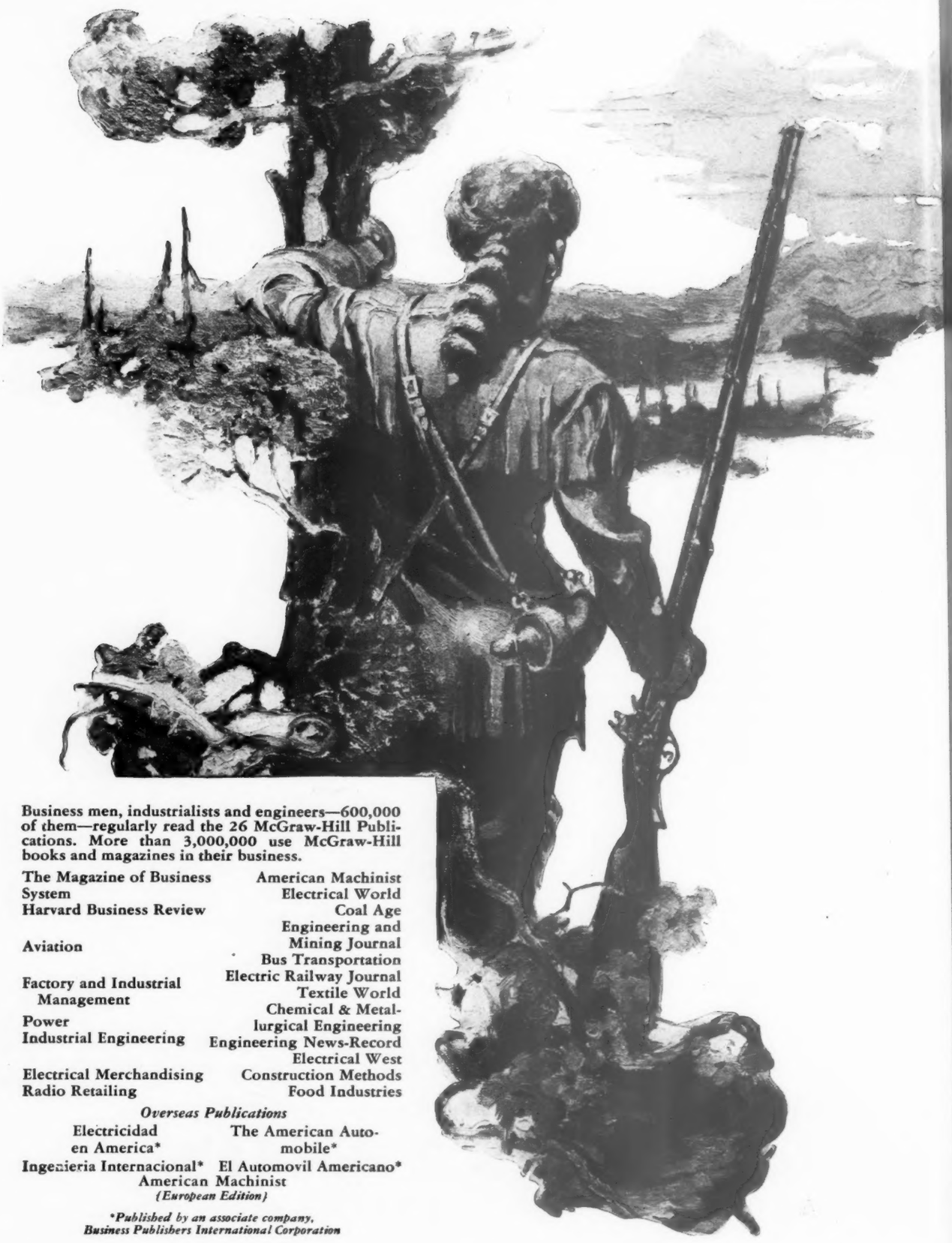
Powered with the Axelson 7-cylinder engine, the Black Eagle attains the ultimate height of performance. The Axelson engine is an expression of highest mechanical excellence. It carries a worthy name—Axelson—a name that has become a symbol of accuracy and fine workmanship.

COMMAND-AIRE

POWERED WITH

AXELSON

ENGINE



Business men, industrialists and engineers—600,000 of them—regularly read the 26 McGraw-Hill Publications. More than 3,000,000 use McGraw-Hill books and magazines in their business.

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Power	lurgical Engineering
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McGRAW-HILL

McGRAW-HILL PUBLISHING COMPANY, Inc., New York - Chicago - Philadelphia

There's ALWAYS *a New FRONTIER*

Daniel Boone blazed the trail. When Yadkin Valley ceased to be a frontier, he moved on from the Carolinas . . . to Kentucky, to the Kanawha, and finally to the region that is now Missouri . . . finding out what was there . . . battling with wilderness and Indians . . . conquering new conditions.

Boone typified the first phase of American pioneer life. But with its passing our frontiers did not pass—they only changed . . . changed from unbroken plains to undiscovered markets . . . from tangled wilderness to unsolved industrial problems. Today's frontiers still have their new horizons of expanding opportunities, advancing standards. But in place of woodcraft the modern pioneer must have *business vision* . . . and the modern business paper is blazing his trail.

❖ ❖ ❖

McGraw-Hill publications are always pioneering on the frontier of business. They scout the research laboratories, the experimental stations, the testing grounds, the furthest outposts and the inmost councils—wherever tomorrow's changes are being conceived—for news, experience and forecast vital to their readers. McGraw-Hill's staff of editors, field correspondents and marketing counselors are themselves leaders in pioneer business thought.

In all, 26 McGraw-Hill publications serve American engineering, industry, trade and business. Each has its field—chemical engineering, electricity, metallurgy, mining, textiles, construction, transportation, aviation, radio, machinery, food, power, plant management, business administration.

The Magazine of Business serves the policy-forming leaders of American business. Each McGraw-Hill publication carries with it to new frontiers the full resources of the entire McGraw-Hill group.

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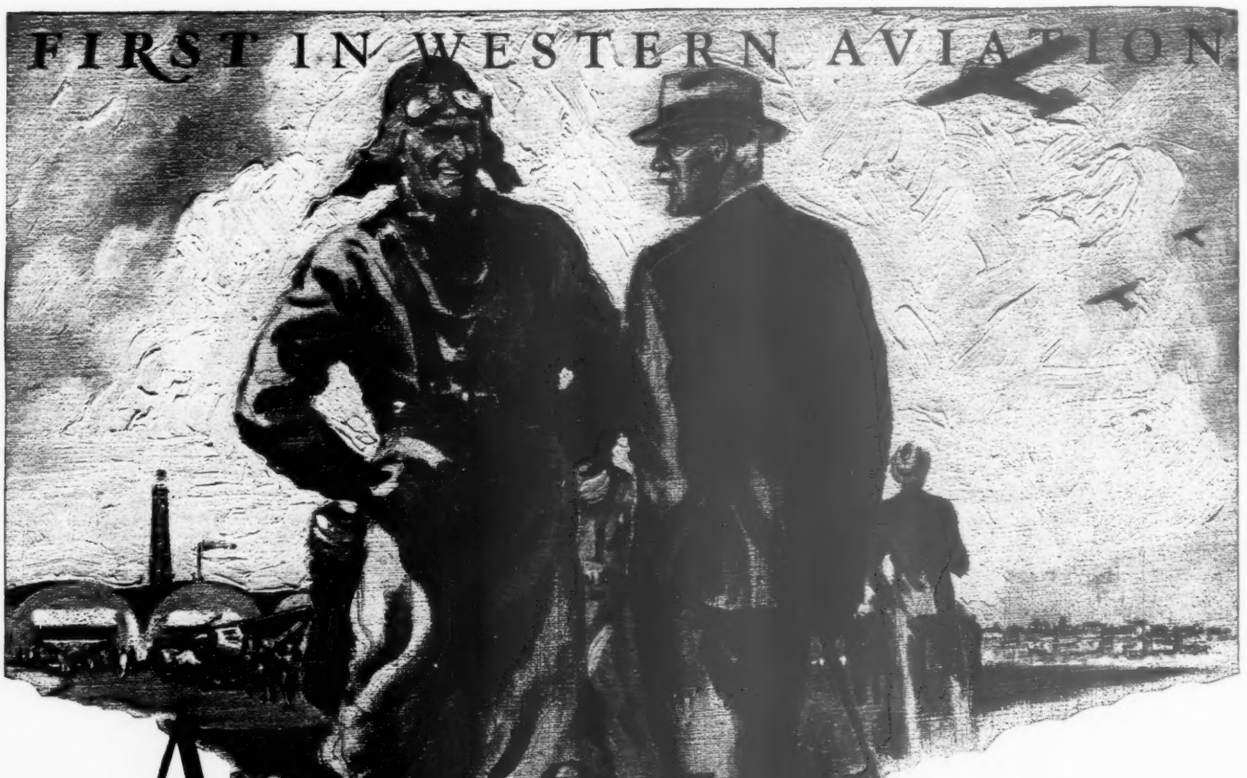
THANK YOU *for mentioning* AVIATION



Aircraft Industry

Enjoys Unique Advantages in Los Angeles County

32% of the aviation activity in the entire United States centers in Southern California. (U. S. Dept. Commerce)

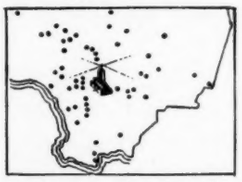
Available investigations by meteorologists, industrial engineers and aviation authorities show conclusively that atmospheric, geographic, industrial and other conditions here are particularly favorable to aviation industry.

12 major factories are now manufacturing airplanes and aircraft motors here. Highest type, experienced, skilled labor is available; 20% of all licensed pilots; 20% of all identified aircraft; 25% of all aviation schools in the United States are in Southern California.

There are 50 or more airports and landing fields in Los Angeles County alone. (See graphic map at left).

Climatic and other conditions are bound to make this the aviation capital of America. The advantages of this immediate territory are not to be had elsewhere.

Industry Here Enjoys:
Freedom from Labor Trouble
Mild Climate
Cheap and Abundant Power and Water
Cheap Fuel
Low Building Costs
Largest Western Market
Splendid Export, Rail and Highway Outlets



Above map shows part of Los Angeles County. Every dot represents an airport or landing field.

Complete detailed surveys and information promptly furnished upon request to the Industrial Department,

Air-minded LOS ANGELES COUNTY

LOS ANGELES CHAMBER of COMMERCE

George I. Stich, well known as the president of the Aero Supply Company, heads the new organization.

ANNOUNCING AN IMPORTANT MERGER

We take pleasure in announcing to the aviation industry the consummation of a merger of the Aero Supply Mfg. Co., Inc., of New York, the Standard Automatic Products Corp'n, of Corry, Penn., and the National Steel Products Co., of Dayton, Ohio. The three plants will hereafter be operated as the Aero Supply Mfg. Co., Inc., with headquarters at its offices—College Point, Long Island, New York. The object of the merger is to give to the industry a hitherto unequaled service in supplies and material, ultimately including everything necessary in the fabrication of airplanes—except motors. The highest possible standards of quality will continue to engage the concentrated and consecrated efforts of the new affiliation, which has for its creed the well known Aero Supply slogan—"Make it safe for the flyers—the world over."

OUR CREED

AERO SUPPLY MFG. CO., INC.
College Point · Long Island
NEW YORK

TACOMA PUBLIC LIBRARY

LIGHTING THE HARBORS FOR SHIPS OF THE SKY

Newark Airport at night as illuminated by an installation of Westinghouse Chromilite Floodlights

DARKNESS, for years the sinister element which has stubbornly fought the progress of aviation, is rapidly being routed. Today thousands of miles of airways, marked by sweeping beacons, guide the night pilot safely over mountains, lowlands and forests to his destination. At the airport, night has been turned into day.

In this development of aviation lighting, Westinghouse, with years of experience in many classes of illumination, has made important contributions. Westinghouse Chromilite landing field floodlights illuminate the airport brilliantly, but without the glaring, upward rays which blind the pilot as he levels off for a landing. Multiple lighting units eliminate the danger of lighting failure at a critical moment; while the flexibility of installation permits perfect illumination of surface conditions and allows economical expansion to take care of increased night traffic.

Westinghouse lighting equipment in many airports throughout the country is making night landings as safe as those by day.

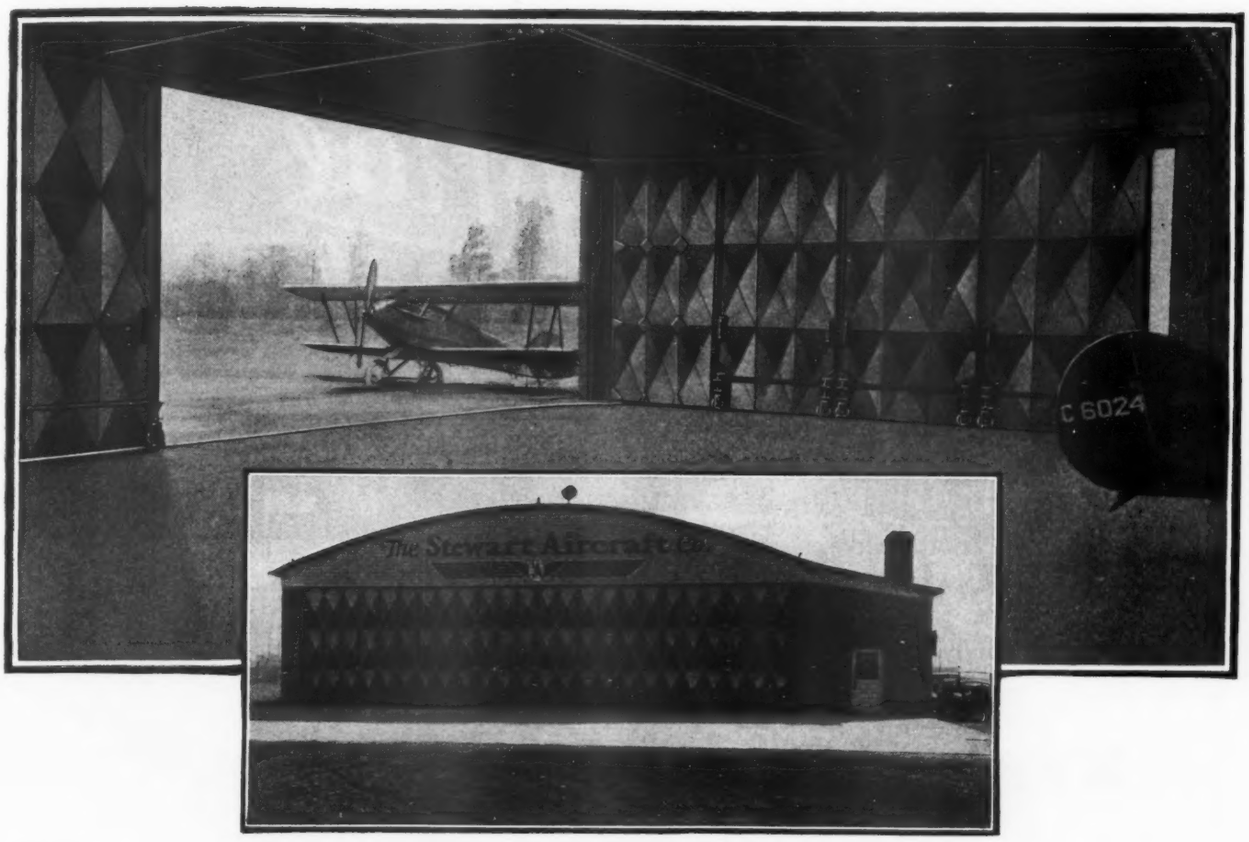
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
COMMERCIAL LIGHTING SECTION
MERCHANDISING DEPT. SOUTH BEND, INDIANA

Westinghouse

T 30575

Serves the Aviation Industry with:

- Chromilite Landing Field Floodlights
- Wind Direction Indicator Lights
- Hangar and Building Floodlights
- Boundary, Approach, Obstruction Lights
- Reflectors
- Light and Power Plants
- Electric Cable
- Transformers
- Motor Generators
- Control Boards
- Micarta Propellers
- Micarta Pulleys
- Micarta Hinges and Fair-leads
- Micarta Sheeting for Cabins
- Micarta Tail Wheels
- Arc Welding Sets



There's an R-W Way for *every* doorway

The hangar of the Stewart Aircraft Company at the Cleveland Municipal Airport has a storage capacity of 10 planes. The doorway of the hangar is 56 ft. wide by 13 ft. 9 in. high.

When Richards-Wilcox engineers were called in to solve the doorway problem for this large opening, they installed 8 all-steel doors. They operate on curved floor rails which permit the doors to slide back to either side, allowing a full width unobstructed opening without center posts.

The top of the doors are guided by ball-bearing rollers between two channel irons. The whole weight of the doors—approximately 3 tons—is carried on R-W ball-bearing rollers running on floor rails firmly imbedded in concrete. The ball-bearing rollers give perfect balance to the doors and make one-man operation easy.

The Richards-Wilcox all-metal construction assures a door that will not warp or swell because of rain, snow, and freezing weather.

Richards-Wilcox all-metal doors and door hardware are not just so much hardware and material. Behind every installation are Richards-Wilcox engineers, who design doorway equipment to function efficiently, economically, and without trouble.

If you have a doorway problem an R-W doorway engineer will be glad to talk it over with you. There's an R-W Way.

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

New York · · · AURORA, ILLINOIS, U.S.A. · · · Chicago

Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines
Minneapolis Kansas City Los Angeles San Francisco Omaha Seattle Detroit

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AMERICA'S FINEST MARINE OIL..

Gulfpride Oil

THE OIL EVERLASTING

is a new product produced by a special department—it meets all requirements of Aviation motors—possessing—

1. **High resistance to oxidation.**
2. **Low Carbon and gum-forming qualities.**
3. **Low pour tests.**
4. **Minimum change of body under extremes of temperatures.**

Approved by leading aircraft builders
Sold in sealed tins only.

Let your motor convince you—

Free sample sent on request.

GULF REFINING COMPANY
Pittsburgh, Pa.

GULF

HOW BIG? HOW SMALL?

PASSENGER transport flying is so new there is little experience on which to base a decision as to what is the ideal plane capacity. However, here are some facts that bear on the subject:

1. The average passenger load of a railroad car is 14.
2. A high average load in 1927 was 4.5 in transport flying.
3. In 1928 a Pacific Coast operator reported an average load of 6.7.
4. Increasing traffic is reducing fares, and fare reductions are increasing traffic.

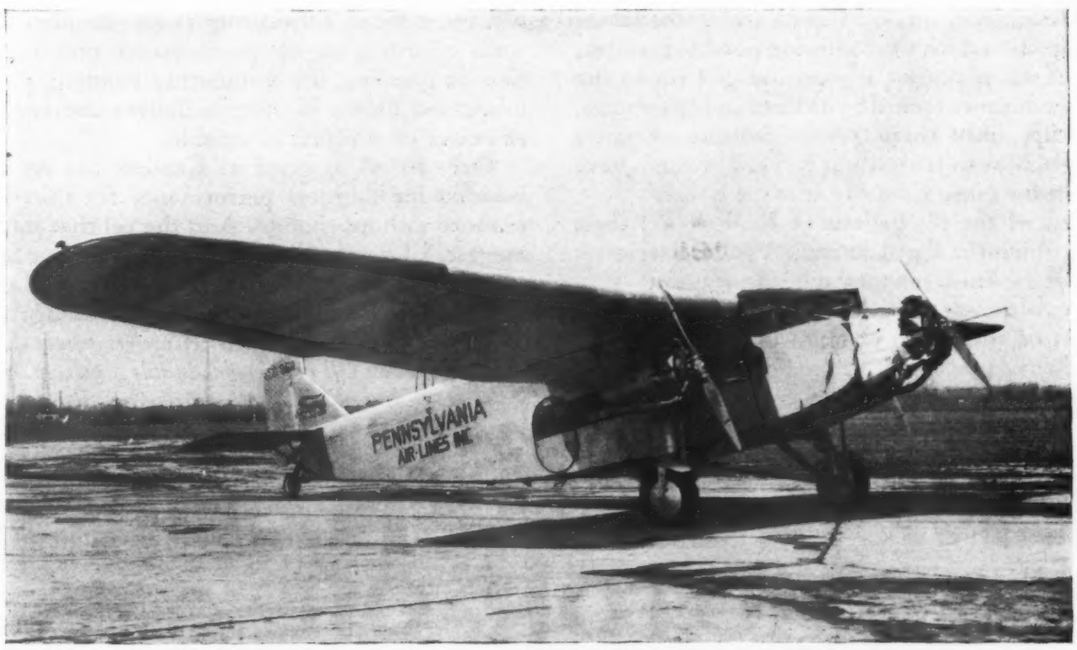
It is to be doubted that airplane passenger loads will exceed railroad car loads for some years, at least. Consequently a top figure of 14 passengers is probably the limit of efficient capacity at present.

On the other hand, with loads on the increase, a plane must be able to take care of the gain in average passenger loads brought about by greater acceptance of flying on the part of the public and by the lowered fares now being charged. This indicates that a capacity of 10 passengers is the lowest that makes safe allowance for traffic increase.

In view of these facts we are convinced the Ford tri-motored, all-metal transport monoplane, with its capacity of ten to fourteen passengers, is exactly the right size for present transport operations. The purchase of Ford planes by leading transport companies shows clearly that they agree this to be the efficient and economical transport plane size. Ford planes deserve your consideration for any transport line you are operating or contemplating. Complete information may be obtained by writing direct to The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

Features of the Model 4-AT Ford Transport

Price $42,000. *(Standard equipped, fly away Dearborn.) All metal throughout. Exposed surfaces of Alclad alloy. Engines:* 3 *J-6 Wright Whirlwind, total power* 900. *Useful load* 3670 *lbs. Landing speed* 55 *miles per hour; cruising* 107-112; *high speed* 127. *Radius of action* 475-580 *miles; ceiling* 15,000 *ft.* 11 *removable passenger seats; heated cabin; toilet. Complete set of instruments; dual wheel control. Independent brakes; rubber compression shock absorbers.*



Model 4-AT Ford plane purchased by Pennsylvania Air Lines, Inc., of Pittsburgh. Powered by three Wright 300 *h-p. Whirlwind engines. Price* $42,000.

April 30, 1929.

Mr. I. H. Shearer,
Kendall Refining Company,
Bradford, Pa.

Dear Mr. Shearer:

Needless to say, in my last endurance attempt during which I established a record of 26 hours, 23 minutes, Kendall Penzbest Oil was used. Of course, my opinion of your product has been quite generally known but after a gruelling test such as the above, allow me to state that it has been raised even higher.

The results speak for themselves and the consumption of one-half gallon is exceptionally low, particularly when you consider the heavy load that was carried.

As you know, I have used your oil since I started flying and have every confidence in it and I should like to congratulate you on its merits.

Sincerely,

Elinor Smith

26 hours-23 min.-2 qts. of Oil

Elinor Smith's record-breaking endurance flight over Roosevelt Field in her Bellanca—Whirlwind Cabin Monoplane, on April 23rd and 24th, will be long remembered for the following notable features:

First of all, a plucky 17-year-old girl broke the World's endurance record by 4 hours and 18 minutes.

Secondly, only three other persons—Charles Lindbergh, Martin Jensen and Royal Thomas—have flown solo for more than twenty-four hours.

Thirdly, of the 8½ gallons of Kendall Penzbest Oil with which the flight started, 8 gallons were remaining at the finish—a total oil consumption of only two quarts .... A truly remarkable indication of the value of good lubrication.

World's records in the air are not achieved easily. Exceptional pilots, exceptional planes, exceptional engines and wise planning are all necessary. Pilots plan wisely when they select Kendall Oil for difficult lubricating tasks. Kendall Oil insures effortless engine performance plus conservation of gasoline, for a smoothly running, perfectly lubricated motor is able to deliver the last ounce of power of which it is capable.

Only an oil as good as Kendall can be recommended for faultless performance for thirty hours or more without change. And the oil that stands up longest, lubricates best. Throughout Elinor Smith's flight, Kendall Penzbest Oil performed as it can always be relied upon to do, according to specification. ***For a list of Airports where Kendall Penzbest Oil is now obtainable, address Aviation Division, Kendall Refining Co., Bradford, Pa.***

KENDALL PENZBEST MOTOR OILS

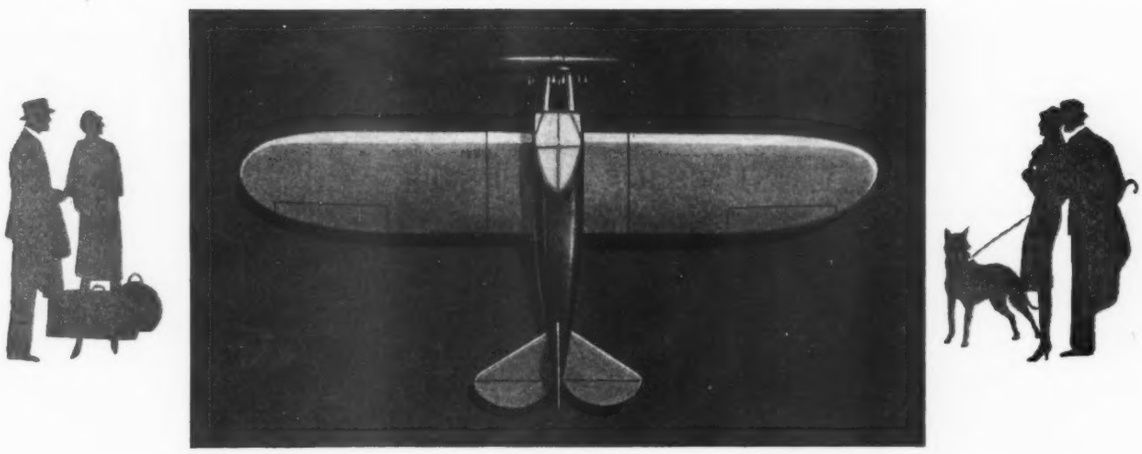
KENDALL PENZBEST MOTOR OIL

Use the Air Mail!

REFINED FROM 100% BRADFORD GRADE OF PENNSYLVANIA CRUDE

See our Exhibit at the National Aeronautical Exposition, Cleveland, Ohio, August 24th to September 2nd.

ALEXANDER



.32 BULLET

Real speed and travel comfort for FOUR PEOPLE AND A DOG, with baggage for all, are attained in the new Alexander .32 Bullet. This economical cabin ship may be powered with either the Wright J6 165-hp. or Kinner 100-hp. motor. If you want a cabin ship, ask for details and place your order now.

EAGLEROCK BIPLANE

O-X5—90 H.P.

J. S. Gehan, veteran pilot of Sioux Falls, R. D., flew home an OX-5. He sold it. Two weeks later he was in for another and ordered a third. He has tried all the OX-5 ships on the market and likes the Eaglerock best. In visibility, ruggedness, performance, ease of control and normal control in all positions it is close to perfection. It is the ideal ship for student training and for students after training. It can be used in commercial work whereas most training ships are one purpose planes.

HISSO "A" 150 H.P.

The standard Hisso "A" Eaglerock with government overhauled motor ready to fly away for $4000 is by far the best seller we have. Performance at top speed compares favorably with ships selling for twice as much. It is one of the best balanced and most easily controlled Eaglerocks in the line. For advanced training, cross country work and general commercial flying it has no equal in low first cost and economical operation.

CHALLENGER 170 H.P.

In actual performance the 170-hp. Challenger motored Eaglerock exceeded theoretical performance by a wide margin. Top speed proved to be 130 miles per hour instead of 119. It is a wonderful ship for demonstrating, sport flying and fast cross country work.

COMET 150 H.P.

The Eaglerock with Comet 150-hp. motor is very popular because of its performance, smoothness and small gas consumption of the motor. Those who want flying ability and economy in the medium price class will appreciate the Comet motored Eaglerock.

WHIRLWIND 225 H.P.

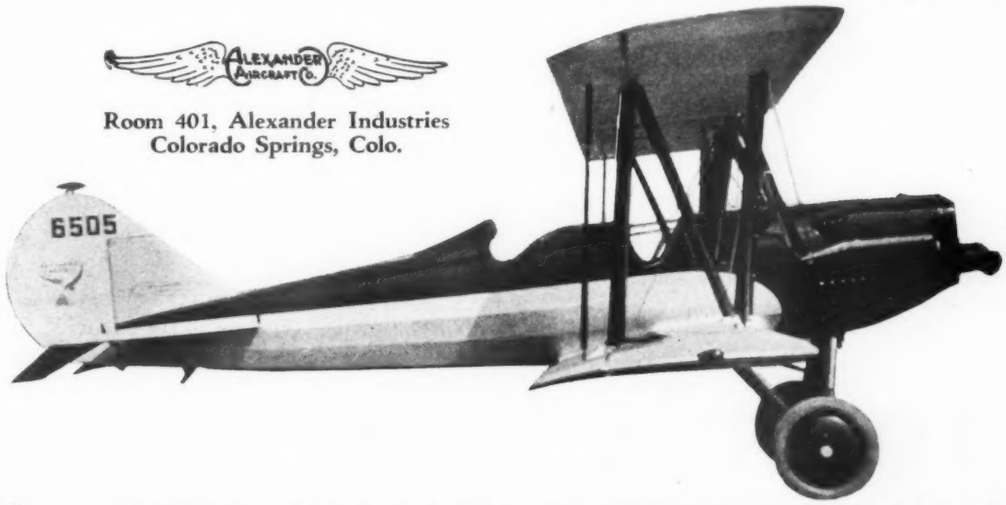
Powered with Wright J-5 225-hp. motor the Eaglerock needs only to be flown to sell itself. It is speedy, has large carrying capacity and a comparatively slow landing speed. In performance and economy it is unexcelled in its class.

A Ship for Every Purpose

For schools and operators in the formative stage we recommend the OX-5 for student training; the Hisso "A" for advanced training and cross country work; the Comet, Challenger and Whirlwind for demonstrating, sport and real fast cross country flying.

ALEXANDER AIRCRAFT CO.

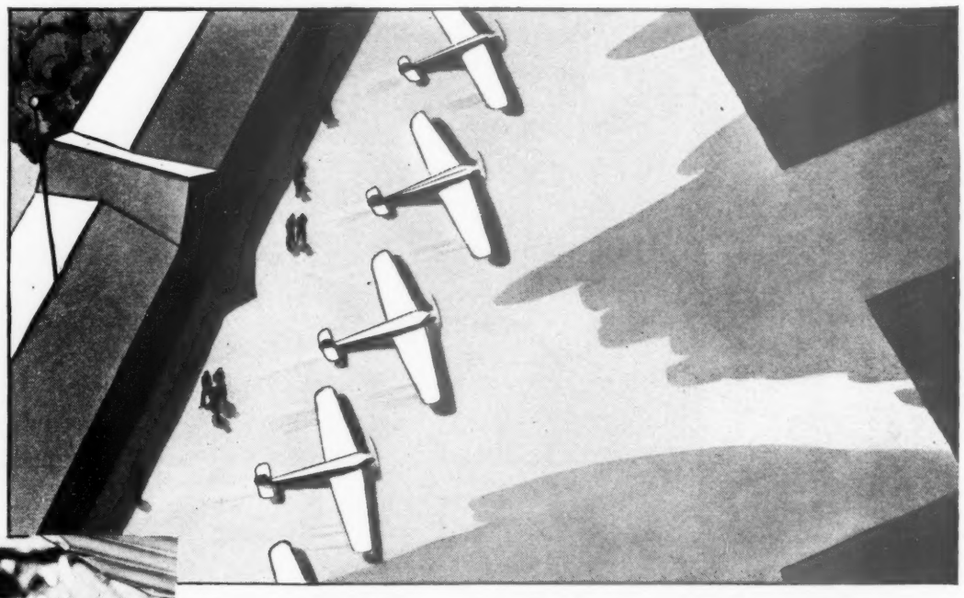
Room 401, Alexander Industries
Colorado Springs, Colo.



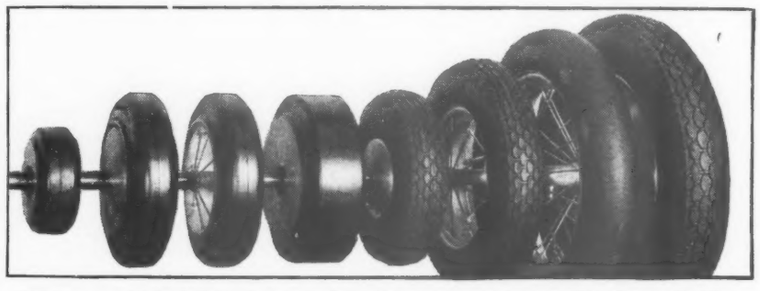
Truly—PERFORMANCE WITH ECONOMY

...and Tail Wheels shall set them free

Goodrich Tail Wheels permit pilots to maneuver planes on the ground with almost as much freedom and independence from outside help as they have in their own automobiles.



The Goodrich Pneumatic Non-skid Tail Wheel as used on Ford Tri-motored Planes.



There are eight different sizes and models of Goodrich Tail Wheels in all. The smaller tail wheels are made of sponge rubber.

FREE . . . to push their own planes *out* of the hangar . . . unaided!

Free . . . to *steer* their way around hangars, to *weave* through parked cars and pedestrians . . . and *head up* into the wind *alone.*

Free . . . to take off quicker, *easier.* To land *safer.* With less *shock* to the fuselage and more *comfort* for the passengers!

. . . *these* are only a few of the intoxicating new thrills made possible by Goodrich Silvertown Airplane Tail Wheels.

There is a more sober significance in their adoption by manufacturers who have *adapted them to their own new model airplanes.*

The mobility of tail-wheel-planes opens up a wide market to *private* ownership. The wheels eliminate the necessity of *hangaring* at municipal or public airports.

Goodrich now supplies eight complete new tail wheel unit combinations *ready for assembly* right on to the plane.

The B. F. Goodrich Rubber Company, Established 1870, Akron, O. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.

Goodrich *Rubber for Airplanes*

the

NEW SERIES SIEMENS

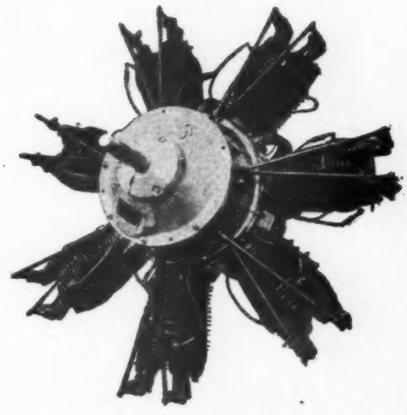
FACTOR ONE: DESIGN

Siemens, giant engineering firm employing over 130,000 skilled workers, in their 17 years' study and research of the requirements of a power plant for aircraft, have produced radial air-cooled engines designed to give *maximum power with minimum mass.*

At the same time, the essentials of *certainty of operation, effective mechanical balance, and uniform delivery of power* have been preserved. Minimum consumption of fuel and lubricating oil are additional features of the NEW SERIES SIEMENS.

The NEW SERIES SIEMENS meet and exceed every requirement of the American aircraft builder, retaining, in addition, the features of previous models which are still noted for their

SMOOTHNESS OF RUNNING
EFFICIENCY and DEPENDABILITY



YANKEE "5" 80 H. P. (SH-13)
YANKEE "7" 110 H. P. (SH-14)
YANKEE "9" 125 H. P. (SH-12)

K. G. FRANK

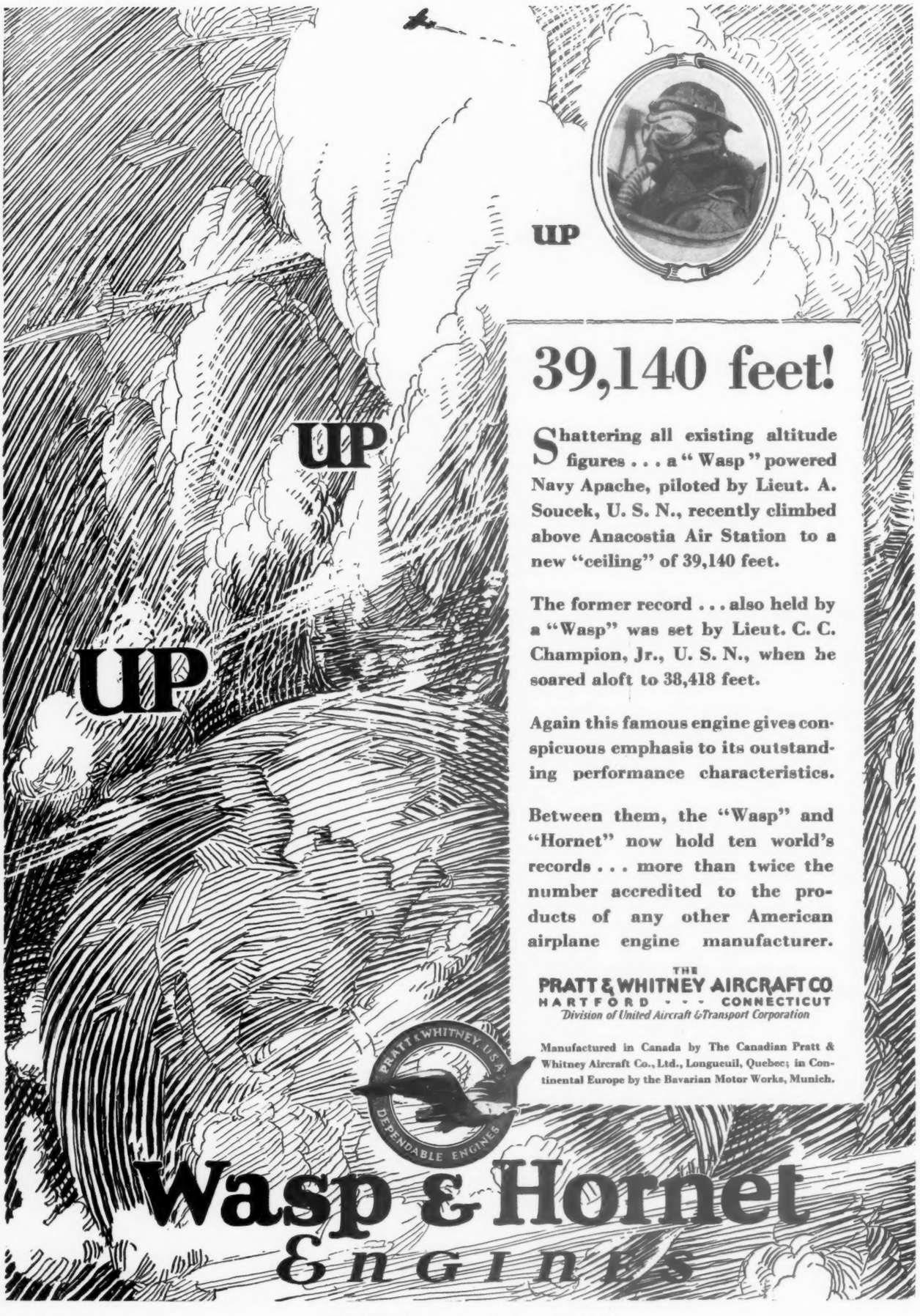
Consulting Engineer

75 West Street **N. Y. C.**

General Representative
SIEMENS AND HALSKE, A. G.

Watch this space for our future advertisements that will describe additional features of the NEW SERIES SIEMENS—quality . . . . . availability . . . . . price range . . . . . service.

THANK YOU *for mentioning* AVIATION


UP
UP
UP
39,140 feet!
Shattering all existing altitude figures . . . a "Wasp" powered Navy Apache, piloted by Lieut. A. Soucek, U. S. N., recently climbed above Anacostia Air Station to a new "ceiling" of 39,140 feet.
The former record . . . also held by a "Wasp" was set by Lieut. C. C. Champion, Jr., U. S. N., when he soared aloft to 38,418 feet.
Again this famous engine gives conspicuous emphasis to its outstanding performance characteristics.
Between them, the "Wasp" and "Hornet" now hold ten world's records . . . more than twice the number accredited to the products of any other American airplane engine manufacturer.
THE PRATT & WHITNEY AIRCRAFT CO
HARTFORD - - - CONNECTICUT
Division of United Aircraft & Transport Corporation
Manufactured in Canada by The Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec; in Continental Europe by the Bavarian Motor Works, Munich.
PRATT & WHITNEY U.S.A.
DEPENDABLE ENGINES
Wasp & Hornet
ENGINES

ECONOMY IN TRANSPORTATION GEARED FOR THIS SWIFT AGE LIES IN THE VALUE OF time saved AS WELL AS IN COST PER MILE OF TRAVEL

Wichita to Alaska and Return
—13085 Miles in 127 Hours

Parker Cramer flew a Monoplane Cessna over half way around the world in five days. His only maintenance was one spark plug cleaned and one valve clearance adjusted.

Monoplanes Cessna are being delivered to New York regularly for eastern buyers. They fly the 1325 miles in 11 to 12 hours. The fastest train time is over 40 hours.

Our records for three average trips to New York show a total cost for gas and oil per hour of $2.50, $2.36 and $1.76. Total cost of trips less than $25.00 each—slightly under 2c per mile. Train fare without Pullman for this trip is $55.54.

MONOPLANES CESSNA are not only the greatest time savers for the busy executive—but actual records prove that travel in these four-place cabin planes is also the most economical from a cost per mile standpoint.

Write our sales representatives for illustrated literature.

CESSNA
"A MASTER'S EXPRESSION"

Manufactured by The Cessna Aircraft Co., Wichita, U. S. A.

CURTISS FLYING SERVICE, INC.

Sole Sales Agents for United States and Canada

NEW YORK OFFICE, GARDEN CITY, LONG ISLAND

NEW--- 1929 MODELS

BLACK & DECKER 5/8-INCH VALVE REFACER --$140

The day of lapping valves into their seats by hand is long past. With the Black & Decker Valve Refacer, Valve Seat Reamers and Valve Seat Grinding Stones, a perfect job can be done on a complete set of valves in about one fifth the time required to do the job by hand, and with a uniform and tested accuracy.

The Black & Decker 5/8" Valve Refacer will grind valves at any desired angle, and is supplied with attachments for—

Dressing the grinding wheel
Squaring or chamfering ends of valve stems
Resharpening valve seat reamers

Extra attachments make it possible to use this machine for—

Grinding expansion reamers
Grinding rocker arms
Dressing breaker points

BLACK & DECKER DELUXE ENGINE KIT--$125

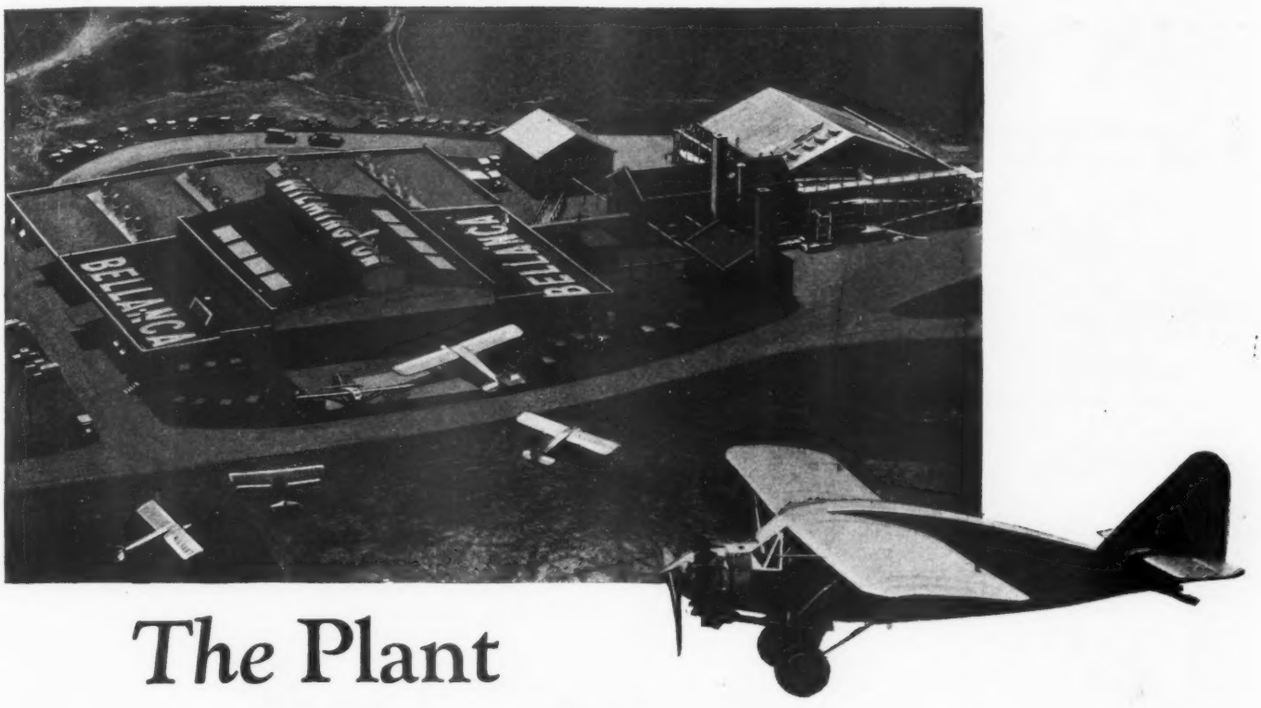
A large convenient metal chest containing the following items—

1- 1/4" Heavy Duty Electric Drill
1- Stand for mounting Drill on bench
1- Valve Seating Stone, 1 3/4" x 45°
1- Valve Seating Stone, 1 7/8" x 45°
1- Valve Seating Stone, 2 1/8" x 45°
1- Reamer, 1 3/4" x 45°
1- Reamer, 1 7/8" x 45°
1- Reamer, 2 1/8" x 45°
1- Narrowing Reamer, 1 3/4" x 20°
1- Narrowing Reamer, 1 7/8" x 20°
1- Narrowing Reamer, 2 1/8" x 20°
1- Narrowing Reamer, 1 1/2" x 70°
1- Narrowing Reamer, 2" x 70°
1- Turning Wrench for Reamers
1- Self-Centering Pilot, 5/16"
1- Self-Centering Pilot, 11/32"
1- Self-Centering Pilot, 3/8"
1- Stone Sleeve
1- Universal Joint for Stone Sleeve
1- Pilot Removing Pin
1- Dressing Mandrel to sharpen Reamers and Stones
3- Sleeves for Reamers
1- Carbon Brush with Holder
1- Valve Guide Cleaner 5/16" to 23/64"
1- Valve Guide Cleaner 3/8" to 27/64"
1- Wire Wheel Brush, 4"
1- Arbor for Wire Wheel Brush
1- No. 1 Valve Tester
1- No. 2 Valve Tester
1- Oil Can for seat grinding
1- Small Hose for seat grinding
1- Large Hose for seat grinding

Write for the new 16 page catalogue describing Black & Decker Valve Grinding and Carbon Cleaning Equipment.

The Black & Decker Mfg. Co.

Toronto, Ontario, Canada — Towson, Md. U. S. A. — Slough, Bucks., England



The Plant *Behind the* Plane

You are welcome at Bellanca Airport, one of the finest flying fields in the East. Come as a ground visitor, or air transient—come for Bellanca service, or a demonstration flight—and learn how ruggedly the Bellanca is built.

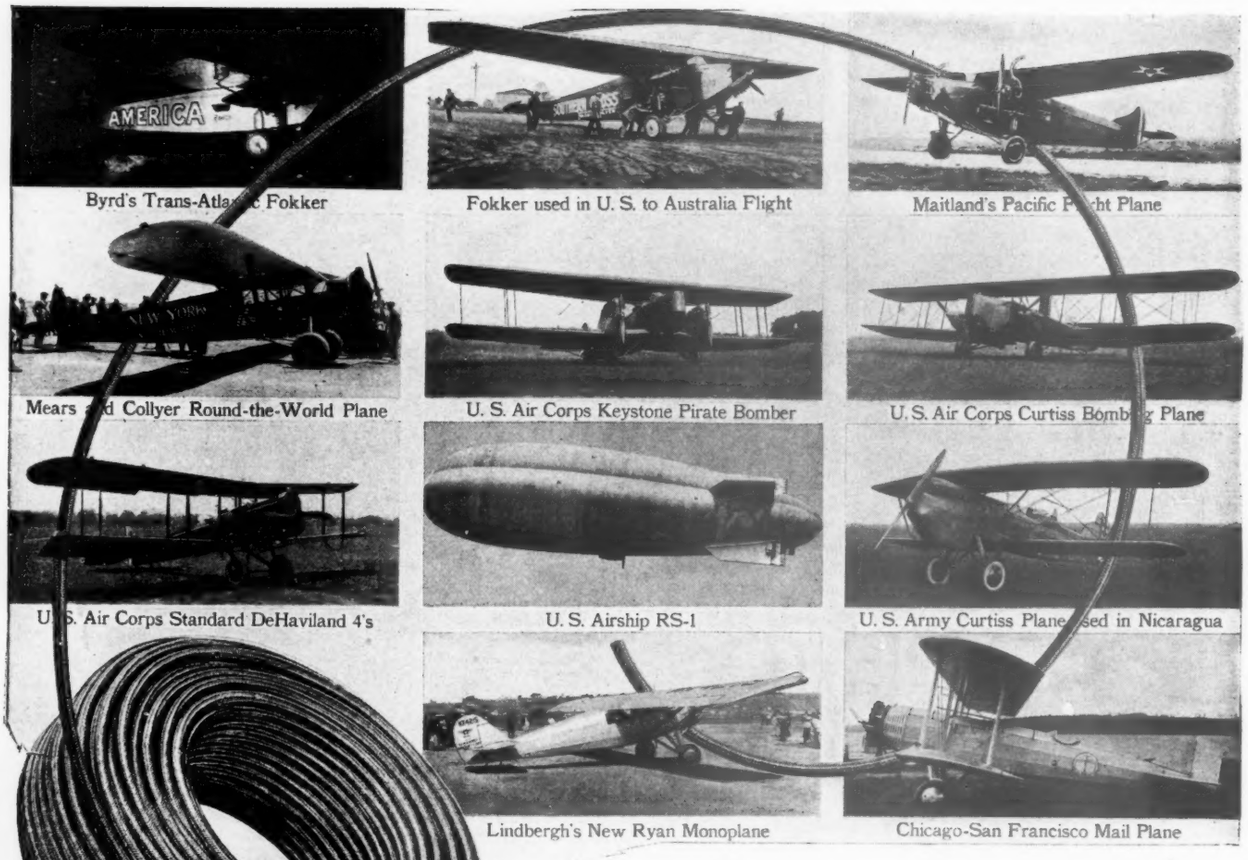
Back of the plane stands a substantially-financed organization, thoroughly equipped in every branch of aircraft building—a busy plant expanded over 100% early this year, to meet the fast-growing demand for Bellanca Aircraft. Here the Bellanca engineers, through consistent study of construction methods and materials, have developed results that mean certainty of delivery and service.

This is where Bellanca performance begins! Speed, climb, comfort and safety are and always have been the built-in features of Bellanca design. Even in aircraft decoration, you find that the originality which introduced the cabin monoplane to American aviation still leads, with interior cabin decoration comparable to the most advanced motor car finishing. Bellanca efficiency is topped off today by the innovations of comfort and luxury which earned for the Bellanca a place of recognized distinction at the Detroit Show. Bellanca Aircraft Corporation, New Castle, Delaware.

BELLANCA AIRCRAFT

The Bellanca Distributor Franchise is a foundation of strength for the profitable development of the distributor's business. It is sound, liberal, and earns the immediate respect of any banker. In this franchise distributors are assured of the complete co-operation of a solidly financed and capably managed manufacturing company with thoroughly organized production facilities.

The Bellanca CH 300 U. S. Department of Commerce Approved Type Certificate No. 129. Acknowledged leader for efficient performance in the Whirlwind-engined class of cabin planes. Quickly disassembled into small, easily-shipped and easily-handled units. Two pilots; dual control; greatest known range of visibility. Seats six persons in comfortable, tastefully appointed cabin. Pilot and payload, 1,215 lbs. Range with full payload, 5½ hrs. or 670 miles at cruising speed. High speed, 145 m.p.h. Cruising speed, 122 m.p.h. Landing speed, 48 m.p.h. Climb at sea level, 1,100 ft. per min. List price: with Wright J-6 engine, $14,950 (with J-5 engine, $14,050).



Byrd's Trans-Atlantic Fokker | Fokker used in U. S. to Australia Flight | Maitland's Pacific Flight Plane

Mears and Collyer Round-the-World Plane | U. S. Air Corps Keystone Pirate Bomber | U. S. Air Corps Curtiss Bombing Plane

U. S. Air Corps Standard DeHaviland 4's | U. S. Airship RS-1 | U. S. Army Curtiss Plane used in Nicaragua

Lindbergh's New Ryan Monoplane | Chicago-San Francisco Mail Plane

Belden Shielded Aircraft Cable *for* Planes Equipped with Radio

BELDEN Radio Shielded Cable has been a tremendous aid in the development of radio communication in aircraft service.

Nearly every American plane that has achieved great renown has been equipped with Belden Wire on low tension service. A few of these famous planes are shown in the illustration.

The use of Belden Aircraft Wires and Cables year in and year out by leading airplane manufacturers and on planes of outstanding achievement is significant evidence of their high quality and utter dependability. It will pay every aircraft manufacturer and every aircraft engineer to write for the Belden Aircraft Wire Catalog.

Mail your request for this valuable booklet today.

Belden Manufacturing Company

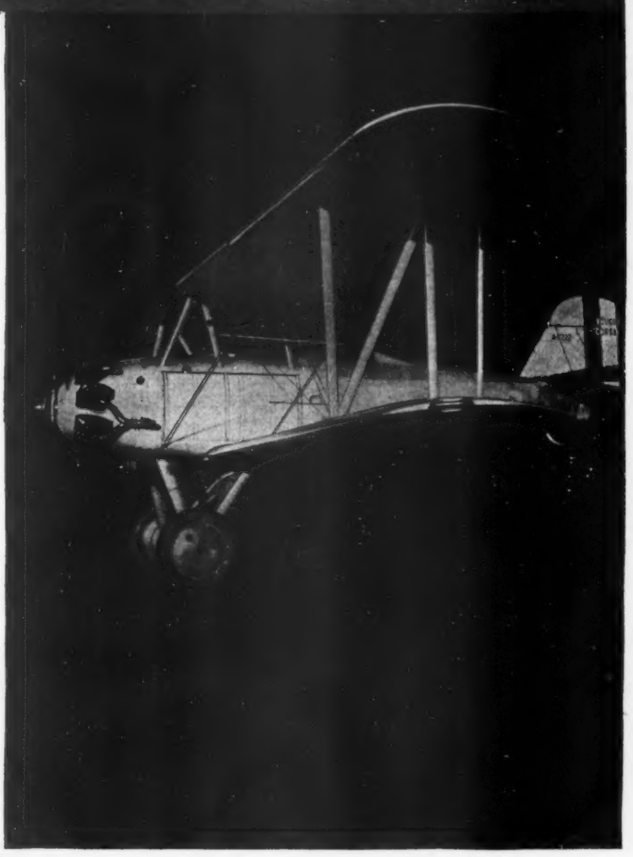
2308-B South Western Avenue **Chicago, Illinois**

BELDEN PRODUCTS

Beldenamel and Textile Magnet Wire
Coil Windings
Beldenmold
(Molded Bakelite Products)
Automotive Wires and Cables
Airplane Assemblies
Radio Wires, Cords and Cables
Rubber Covered Wires
Armored Cables
Flexible Armature Wires
Motor Lead Wires
Braided and Stranded Copper Cables
Cotton Sleeving

Specify Belden

Airplanes VOUGHT



FAST, BRILLIANT PERFORMANCE WITH ASTONISHING SMOOTHNESS AND EASE . . .

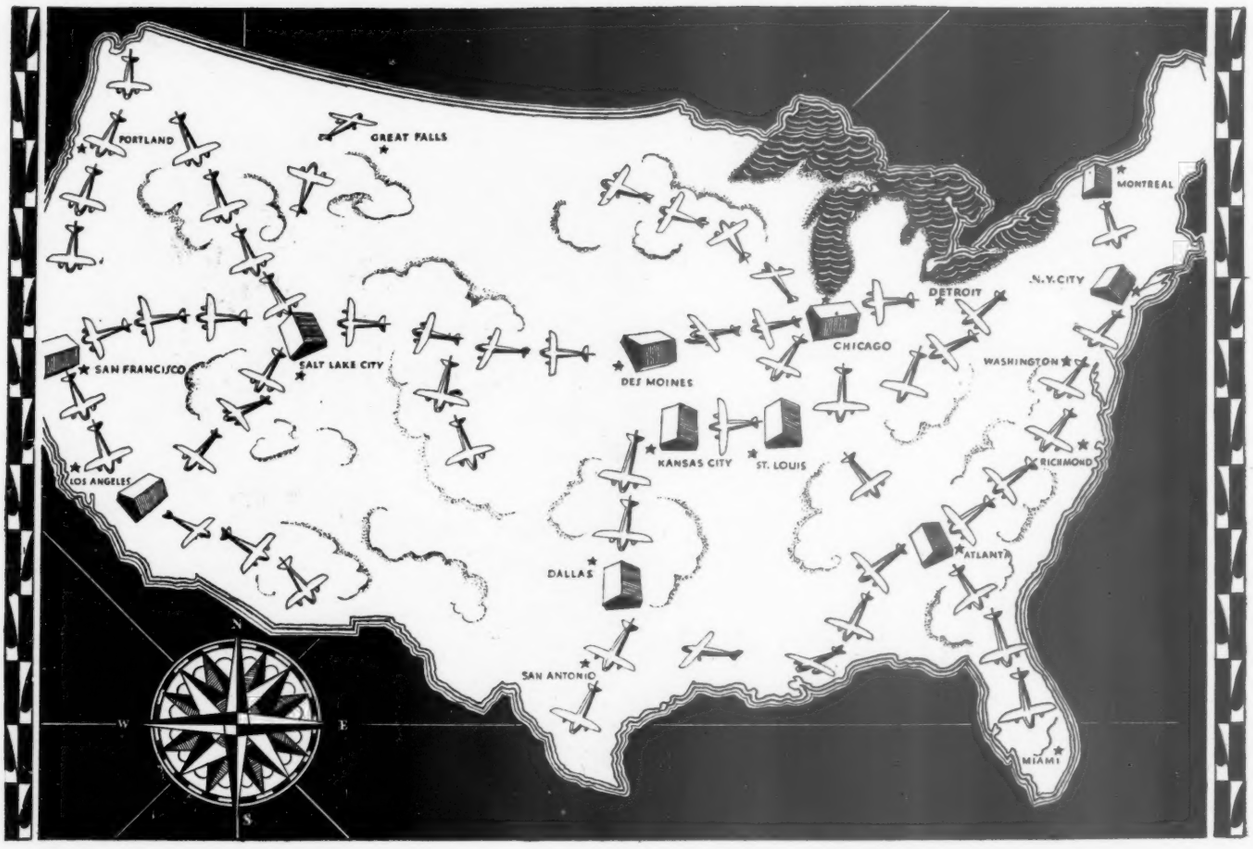
that's the story of Vought planes in a nutshell. Speed—160 and better, in fact, these exceptional planes will both outclimb and outmaneuver lighter pursuit planes at 18,000 feet and over. The perfect balance, inherent stability, and rugged construction of Vought quality planes have been put to the most crucial tests time and again. Is it any wonder that Vought "CORSAIRS" are standard equipment in the United States Naval Air Service? These remarkable planes are convertible to land planes, seaplanes or amphibions—each one a superior all around performer.

CHANCE VOUGHT CORPORATION

Division of The United Aircraft and Transport Corp.

Long Island City, New York

THANK YOU *for mentioning* AVIATION



A VAST TESTING LABORATORY

that points to one conclusion!

THE air mail service—flying a daily average of 38,000 miles—is the vast testing ground of aviation, where theories and materials get their baptism of fire—where their weaknesses are found out—their strengths developed.

From this testing laboratory has come the inescapable conclusion: Aluminum and its alloys are sure to play a part of ever-increasing importance in the development of aviation.

Already more than one half the material in the modern airplane engine is Aluminum alloy, with a weight saving of more than 50% over iron or steel.

Forged Aluminum alloy propellers with an almost everlasting life have displaced easily shattered wood with its average life of less than 200 flying hours.

And there is hardly a part of the fusilage to which designers are not applying Aluminum alloys with a consequent gain of strength, durability and safety.

Aluminum Company of America offers a dependable supply of Alclad sheet and tubes; and of castings, forgings and screw machine parts, made of Aluminum and its alloys. Inquiry, correspondence and personal contact with our technical staff is invited.

ALUMINUM COMPANY OF AMERICA
2482 Oliver Building, Pittsburgh, Pa.
Offices in 19 Principal American Cities
Aluminum in Every Commercial Form

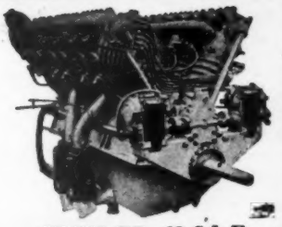
ALUMINUM AND ITS ALLOYS
for Aircraft

SOCIÉTÉ LORRAINE

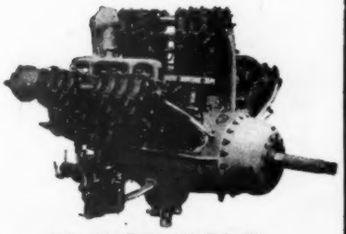
200 ROUTE DE BEZONS
A ARGENTEUIL. (S.&O.)

TÉLÉPHONE
WAGRAM: 99.87

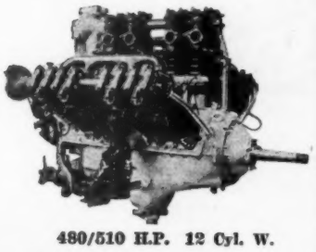
REG. COMMERCE
SEINE. Nº 111·677



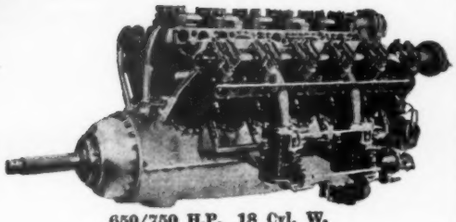
100/410 H.P. 12 Cyl. V.



450/500 H.P. 12 Cyl. W.
Direct Drive or Geared.



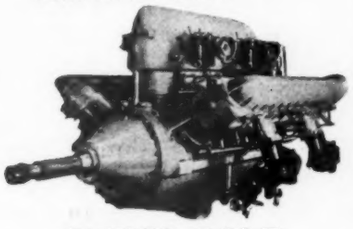
480/510 H.P. 12 Cyl. W.



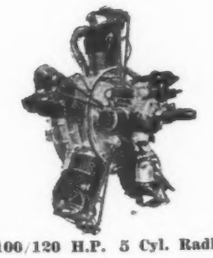
650/750 H.P. 18 Cyl. W.
Direct Drive or Geared.

MOTEURS D'AVIATION

LORRAINE

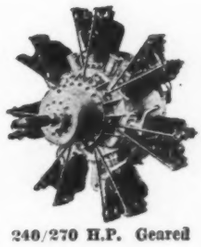


600/700 H.P. 12 Cyl. W.
Direct Drive or Geared.



100/120 H.P. 5 Cyl. Radial

240/270 H.P. 7 Cyl. Radial



240/270 H.P. Geared

470/540 H.P. 14 Cyl. Radial
Direct Drive or Geared.

Marine Motors of 250 and 500 H.P.

Automobiles 15 H.P. Sport and Touring Models

The ARROW Sport

AMERICA'S FASTEST SELLING SPORT PLANE

ARROW PERFORMANCE

Arrow performance is a byword in the Aeroplane industry.

Test the Arrow Sport—hang it on the prop—stall without power—feel it come out without spinning. Try it again—upside down—loop—barrel roll. It is all the same to the Arrow Sport.

Arrow Sport stability lends confidence to the student pilot, yet Arrow is sporty enough to thrill the most daring of aces.

Designed to stand the shock of student landings and engineered for maximum efficiency in performance by the world's largest manufacturers of sport planes.

Get in touch with your nearest distributor—ask for a demonstration and let the Arrow Sport prove itself.

Powered with Velie 60-hp.—Le Blond 60 and 90 hp. and Kinner 100 hp. Motors.

Approved Type Certificate 115

Arrow Aircraft and Motors Corporation

Havelock, Nebraska

Distributors

East Coast Aircraft Company, Curtiss Field, Long Island.
Wetmore Savage Aircraft Corporation, Boston, Mass.
Fleetwing Incorporated, Worcester, Mass.
Flo Flying Service, Inc., Ann Arbor and Detroit, Mich.
Fergus Falls Air Service, Inc., Fergus Falls, Minn.
Fairfax Flying Service, Kansas City, Missouri.
Paul Harten, St. Louis, Missouri.
Sidles Airways Corporation, Lincoln, Nebraska.
Paul Eidsmore, Seattle, Washington.
Northwest Air Service, Seattle, Washington.
Joe Lewis, Municipal Airport, Long Beach and Los Angeles, Cal.

THANK YOU *for mentioning* AVIATION

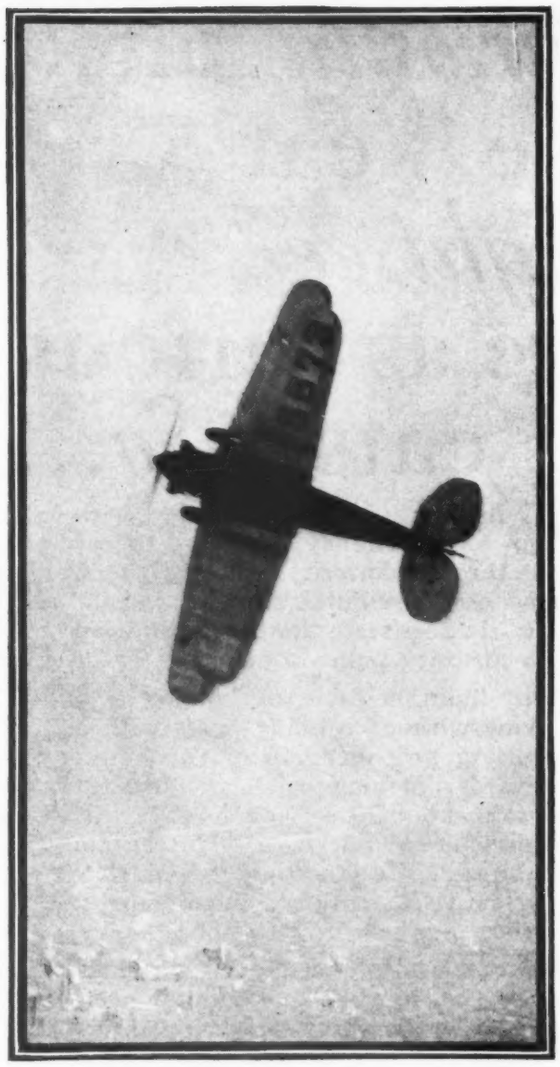
They call it the "SPEEDWING"

"SPEEDWING"... the new name pilots are using for the WACO *we* named the Taper-Wing. And we rather like the expression..."Speedwing". For it designates a typical feature of this master WACO "220"... "the joy of watching the towns slip by" ...at 145-150 top speed... 125-130 cruising.

But . . . please note! . . . notwithstanding the way the WACO "Taper-Wing" eats up the miles, it lands only about seven miles faster than the "Straight-Wing" job. Like all WACOS, it's in and out of the smallest fields with ease. And it's extremely maneuverable . . . in normal *or* inverted flight.

You ought to know the *thrill* of "Speedwing" performance! Take it up and find out.

Write for complete details



The WACO "220" Taper-Wing

J-5 Wright "Whirlwind" motor
(220 H. P.—9-cylinder)
Metal propeller
Bendix brakes
Navigating equipment
Dual Controls
Customer's choice of colors

$8525

THE ADVANCE AIRCRAFT COMPANY, TROY, OHIO

WACO AIRPLANES

"ASK ANY PILOT"

Curiosity killed the cat *Sightseers* are as curious as cats . . *So* . . .

CATS are lucky animals — with nine lives they can afford to lose one through curiosity. The sightseer, however, gets but a single chance at life. It does seem that he would keep his curiosity under control.

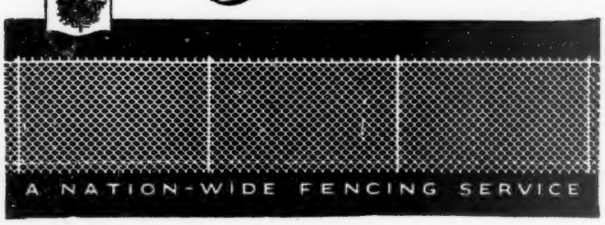
Why flying field visitors cannot see a 'plane without rubbing noses with a whirling propellor . . . why they dash towards a moving plane . . or why they swarm about the scene of an accident, is difficult to understand. Humans do these things for the same reason that they stick a tentative finger onto a surface marked "Wet Paint."

Since spectators cannot resist curiosity, they must be kept out of danger, and out of the way. Airport operators everywhere are installing Anchor Fence so as to restrict sightseers to safe areas. Have the Anchor Fencing Specialist plan and erect this barrier protection for your airport.

ANCHOR POST FENCE COMPANY
Eastern Ave. & Kane St., Baltimore, Md.

Albany: Boston: Charlotte: Chicago: Cincinnati: Cleveland: Detroit: Hartford: Houston: Los Angeles: Mineola, L. I.: Newark: New York: Philadelphia: Pittsburgh: St. Louis: San Francisco: Shreveport.
Representatives in other cities. Consult phone directory.

ANCHOR CHAIN LINK *Fence*



A NATION-WIDE FENCING SERVICE

C & L 32

This is one of the most popular blow-torches we have ever made. It is more expensive than the 158 because it is made for much harder use. It is designed for the man who uses a blow-torch in his daily business and demands not only excellent performance but rugged ability to stand rough handling. 32 contains the most advanced, patented C & L blow-torch improvements. It also has a gold-banded red handle. Sure sign of satisfaction.

You're investing in better and longer performance when you buy a Clayton & Lambert

An expanded gas orifice makes a blow-torch a piece of junk. And it's the easiest thing in the world to enlarge the orifice in an ordinary torch. But a No. 32 Clayton & Lambert blow-torch has an orifice that CAN'T BE ENLARGED—no matter how carelessly or how tight you close the valve. It's a patented Clayton & Lambert improvement—one reason why you get longer service when you buy a Clayton & Lambert.

In addition to being non-spreading, the orifice will not clog. As you close down the valve the carbon cleans out automatically. The improved orifice is but one of MANY Clayton & Lambert advancements. Every bit of mechanism is designed to give you quicker, better action. Inside and out, a Clayton & Lambert is built for long, strenuous use. Where a hard bump might occur, a Clayton & Lambert in reinforced. Wherever extra protection should be—you'll find it in Clayton & Lambert.

As an example, all Clayton & Lamberts are made NON-EXPLOSIVE by a patented method of building the fittings into the tank. The vaporizing chamber is another Clayton & Lambert feature. Its special vein system gives you quicker heat—more heat—and cuts down your fuel bills. You can't see these things which Clayton & Lambert have done to give you the blow-torch you want. They're inside—in the "works," the important part of a torch. But they're there—along with numerous other refinements. They account for superior performance and durability. And that's why Clayton & Lamberts are the most popular torches in the world.

You'll know a Clayton & Lambert by the red handle with a gold stripe. Insist that your blow-torch has that handle—and you'll get your greatest money's worth.

CLAYTON & LAMBERT
MANUFACTURING CO.
Detroit, Michigan

ANNOUNCING
AIRPLANE SPRING CO.
(SUBSIDIARY OF LEE SPRING CO., INC.)

Organized to manufacture springs for Airplanes and Airplane Engines, especially Valve Springs.

The equipment, experience and knowledge of the Lee Spring Company, Inc., who for many years have made springs for leading aircraft manufacturers, plus the engineering and laboratory facilities of the Airplane Spring Company creates an organization fully competent to make the finest of springs from the most exacting specifications.

We invite all manufacturers of Airplanes and Airplane Engines to make use of our facilities.

BUILT FOR SAFETY
TRADE MARK REG.

AIRPLANE SPRING CO.
(SUBSIDIARY OF LEE SPRING CO., INC.)
30 Main St., Brooklyn, N. Y.

The real facts *about the* *Kinner Powered* American Eagle *Biplane*

When the first Kinner Powered American Eagle Biplane was built, we were confident that it would become the outstanding new airplane of the year. That expectation has been confirmed by the reports of flyers testifying to its wonderful performance. But no testimonial could be more significant than the following actual statistics:

Twelve and seven-tenths per cent of all new production type biplanes now in use are American Eagles.

This fact speaks for itself. The Kinner Powered American Eagle Biplane has won record-breaking popularity through record-breaking *performance*. We are eager to demonstrate.

See the American Eagle dealer nearest you—or write us direct. An extraordinary proposition is now being offered to dealers and distributors.

AMERICAN EAGLE AIRCRAFT CORP. FAIRFAX AIRPORT KANSAS CITY · KANSAS

THANK YOU *for mentioning* AVIATION

Ball Bank Indicator, with case of Bakelite Molded. Made by Emil Daiber, Cleveland, Ohio.

Daiber Adopts *Bakelite Molded* for Indicator Casings

WHEN the casing of the Daiber ball bank indicator was made of metal, it required a painted surface for protection against atmospheric extremes of humidity and temperature. To overcome this problem Emil Daiber developed a light weight indicator casing of non-hygroscopic and non-corrosive Bakelite Molded.

Formed in one press operation, these Bakelite Molded cases are uniform in all dimensions and their use eliminates the machining formerly required. Recesses for the "filled" numerals, and all necessary screw holes are completed in the molding operation. The lustrous finish is acquired in the mold and remains undimmed through years of service.

Strong and light in weight, Bakelite Molded is well adapted to the requirements for insulation parts of aircraft electrical equipment, and to the production of accessories and instruments. Unaffected by exposure to weather conditions, this material is non-deteriorating and provides parts of unusual durability.

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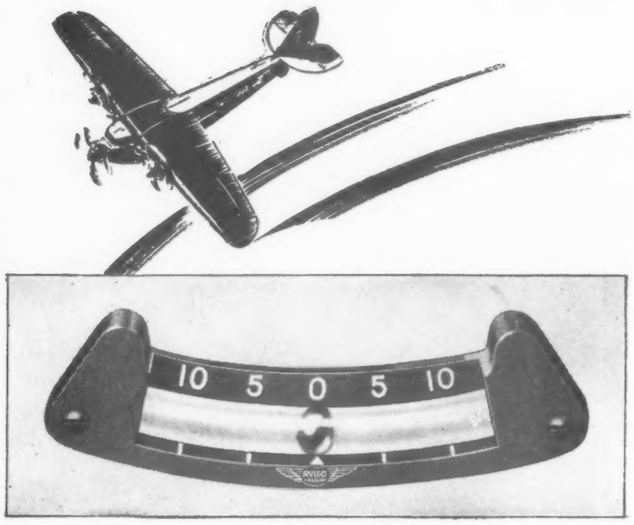

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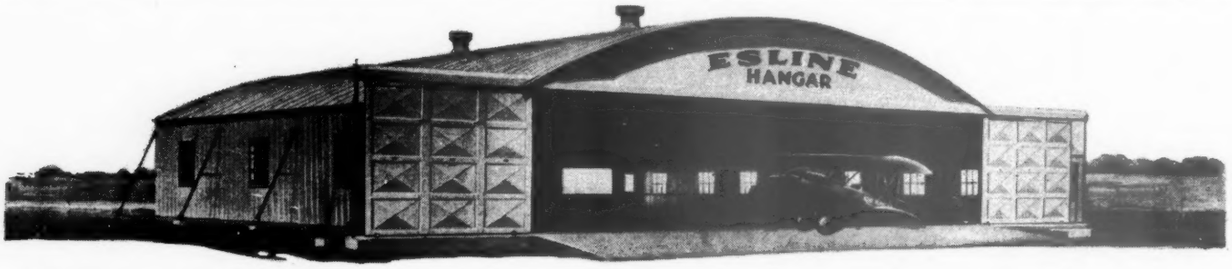

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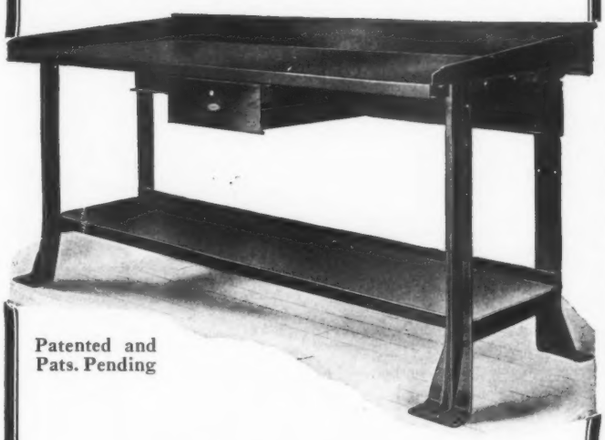

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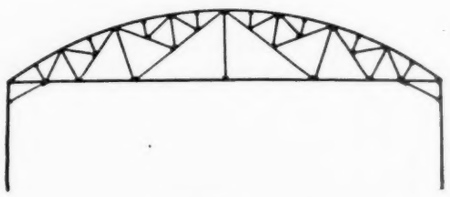

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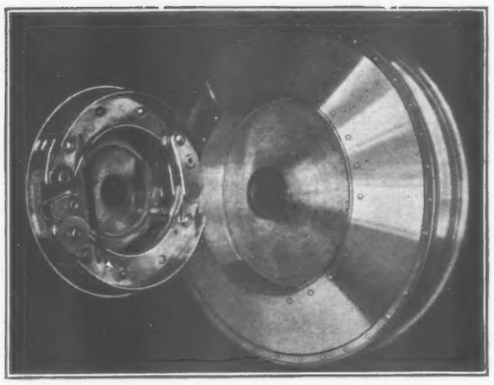

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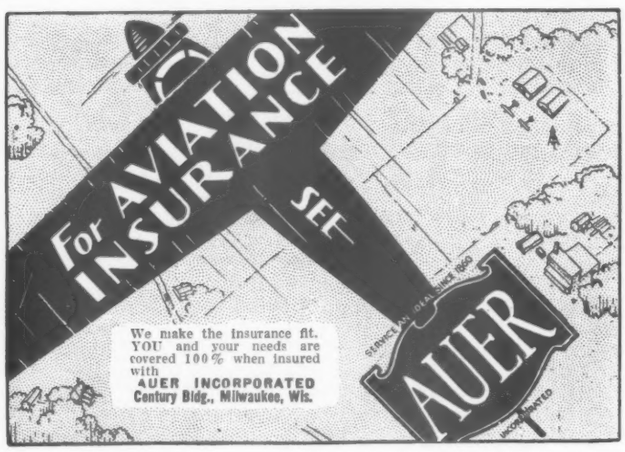
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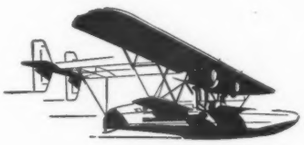

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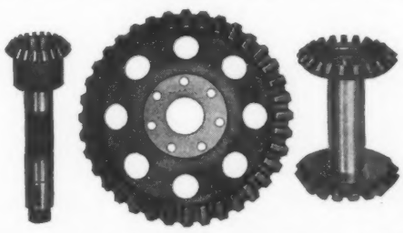

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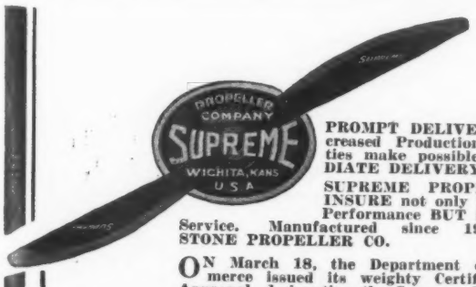

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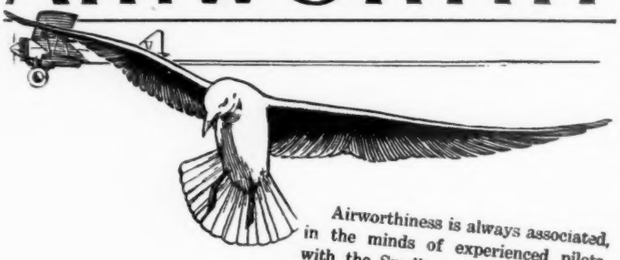

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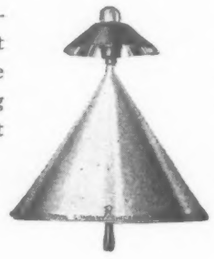

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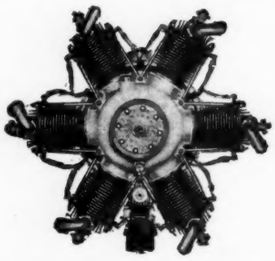

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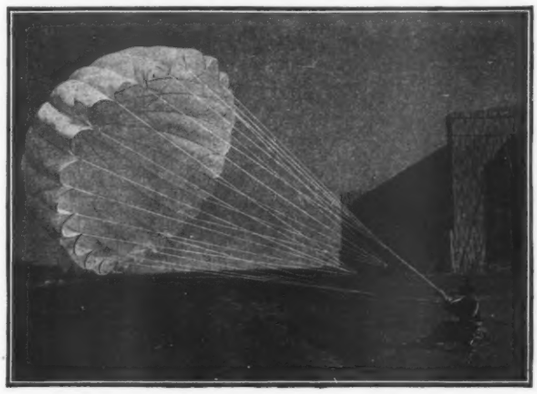

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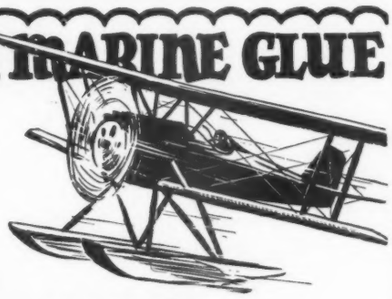

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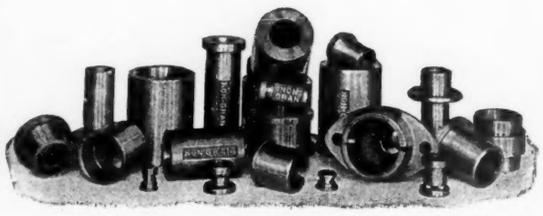

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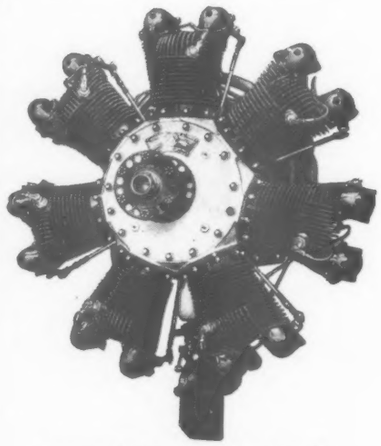

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AIRCRAFT inspectors, men experienced on hull and cowling, also doping and finishing. Army and Navy Standards. Answer in writing giving complete qualifications. P-81, Aviation, Tenth Ave. at 36th Street, New York.

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EXPERIENCED aeronautical engineer wanted, familiar with all work in connection with the complete design of airplanes. P-85, Aviation, Tenth Ave. at 36th Street, New York.

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PRODUCTION engineer wanted by aircraft manufacturer. P-91, Aviation, Tenth Ave. at 36th Street, New York.

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TRANSPORT pilot wanted, at least 1,000 hours' experience, to fly Whirlwind New Standard. P-84, Aviation, Tenth Ave. at 36th Street, New York.

TRANSPORTATION pilot wanted, competent instructor. Base pay $50 weekly; $3 per hour for cross country, instruction, photography; 5 per cent additional on passenger rides. Write giving references, Barrett Airways, 122 East 42nd Street, New York City.

WRIGHT mechanic wanted, capable of top overhauling. State experience and salary expected. P-83, Aviation, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

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NAVY-trained transport pilot, college man, has over 600 hours logged and certified, including time on Vought Corsair amphibians, Loening amphibians, single and twin-motored flying boats and aircraft carrier landings. Opportunity of working into an administrative position from the flying end of an established air line or general service corporation much preferred to a large starting salary. Available about the first of August. Naval Aviator, 1716 Meade Ave., San Diego, Calif.

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Wanted—Partner in Airport

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Advance Aircraft Co. 1933
Aeromarine-Klemm Corp. 1903
Aero Supply Mfg. Co. Inc. 1854-1915
Airplane Spring Co. 193-
Alexander Aircraft Co. 1921
Aluminum Co. of America 1930
American Eagle Aircraft Corp. 1935
American Non-Gran Bronze Corp. 1948
Anchor Post Fence Co. 1934
Arrow Aircraft & Motor Corp. 1932
Auer Inc. 1942
Austin Co., The 1863
Aviation Protection, Inc. 1942
Axelson Machine Co. 1910-1911
B G Corporation, The 1946
Bakelite Corp. 1936
Barber & Baldwin, Inc. 1944
Belden Manufacturing Co. 1928
Bellanca Aircraft Co. 1927
Bendix Brake Co. 1942
Berliner-Joyce Aircraft Co. Inc. 1866
Berry Brothers, Inc. 1857-1858
Black & Decker Mfg. Co., The 1926
Blaw-Knox Co. 1856
Bohn Aluminum & Brass Corp. 1848
Bourdon Aircraft Corp. 1945
Brownback Motor Laboratories, Inc. 1946
Canvas Leather 1946
Carrom Co., The 1945
Cessna Aircraft Co. 1925
Clayton & Lambert Mfg. Co. 1934
Command-Aire Inc. 1910-1911
Consolidated Instrument Co. of America, Inc. 1943
Cunningham-Hall Aircraft Corp. 1943
Curtiss Flying Service Inc. 1859
Curtiss Robertson Airplane Mfg. Co. 1909
Dennison Airplane Co. 1947
Doyle Aero Corp. 1938
D. W. Flying Service 1943
Eagle Ottawa Leather Co. 1948
Elgin National Watch Co. 1936
Esline Company 1938
Fairchild Aviation Corp. & Subsidiaries 1947
Ferdinand & Co., L. W. 1947
Frank, K. G. (Siemens & Halske) 1923
Gardner Propeller Works 1948
Goodrich Rubber Co., B. F. 1922
Gulf Refining Co. 1918
Hall Aluminum Aircraft Corp. 1945
Hamilton Aero Mfg. Co. 1944
Indianapolis Tool & Mfg. Co. 1943
International Derrick & Equipment Co. 1947
Irving Air Chute Co. 1947
Kendall Refining Co. 1920
Knoll Aircraft Corp., The 1862
Kreider-Reisner Aircraft Co. Inc. 1904-1905
LeBlond Aircraft Engine Corp., The 1948
Los Angeles Chamber of Commerce 1914
McGraw-Hill Book Co. 1940
McGraw-Hill Publishing Co. 1912-1913
Mahoney-Ryan Aircraft Corp. 1906
Martin, Glenn L. Co., The 1849
Metal Aircraft Corp. 1855
Moth Aircraft Corp. 1955
New Jersey Vener Co. 1942
Nicholas-Beazley Airplane Co. Inc 1864-1940
Oakite Products Co. 1937
Perry-Austen Mfg. Co. 1948
Pitcairn Aviation, Inc. 1946
Pratt & Whitney Aircraft Co. 1924
Pyle National Co. 1944
Quaker State Oil Refining Co. 1908
Radio Marine Corporation of America 1937
Richards & Wilcox Mfg. Co. 1917
Robertson Co., H. H. 1907
Roebling's Sons Co., John A. 1945
S K F Industries, Inc. 1902
Scintilla Magneto Co. 1867
Searchlight Section 1949-1953
Service Steel Co. 1944
Shelton Looms 1939
Sikorsky Aviation Corp. 1943
Societe Lorraine-Dietrich 1931
Spartan School of Aeronautics 1860
Standard Oil Co. of Indiana 1868
Standard Pressed Steel Co. 1939
Stout Metal Airplane Co. 1919
Streloff-Naughton Corp. 1945
Summerill Tubing Co. 1942
Supreme Propeller Co. 1943
Swallow Airplane Mfg. Co. 1944
Texas Pacific Coal & Oil Co. 1861
Thomas & Armstrong 1942
Timm Airplane Corp. 1947
Titanine, Inc. 1941
Travel Air Mfg. Co. 1850-1853
United Aeronautical Society 1948
U. S. Aviation Underwriters 1946
U. S. Hammered Piston Ring Co. 1945
Vacuum Oil Co. 1865
Valentine & Co. 1899
Vought Corp., Chance 1929
Warner Aircraft Corp. 1900-1901
Westinghouse Electric & Mfg. Co. 1916
White Dental Mfg. Co., S. S. 1946
Wright Aeronautical Corp. 1956
Yancey, Capt. Lewis, A. 1941

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AIRCRAFT SERVICE DIRECTORY
- Addington Aircraft Co. 1949
- Boston Auto Gage Co. 1949
- Cleveland Tool & Supply Co. 1949
- Esline Co. 1949
- Flottorp Propeller Co. 1949
- Haskelite Mfg. Co. 1949
- Ludington Philadelphia Flying Service, Inc. 1949
- Magsby & Buscher 1949
- Monumental Aircraft Inc. 1949
- N. Y. Aircraft Distributors 1949
- Paxon Lumber Co., Frank 1949
- Pioneer Instrument Co. 1949
- Posey & Co., J. V. G. 1949
- Plycor Co. 1949
- Rieker Instrument Co. 1949
- Strauss & Buegeleisen 1949
- Stewart, Robert J. 1949
- U. S. Model Aircraft Corp. 1949
- Wies, Inc. 1949
- Young Radiator Co. 1949

BUSINESS OPPORTUNITIES 1953

EMPLOYMENT 1953

PROFESSIONAL SERVICES
- Aerotech, Inc. 1949
- Black & Bigelow, Inc. 1949
- Showalter Associates 1949
- Jacobson, G. H. 1949
- Thompson Co., Hugh L. 1949

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ALBANY, N. Y.

Field Office: Albany Air Port
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Moth Aircraft Corporation,
Lowell, Mass.

March 22, 1929.

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Albany Air Service, Inc.,
G. E. Walker
President.

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MOTH AIRCRAFT CORPORATION, Lowell, Mass.

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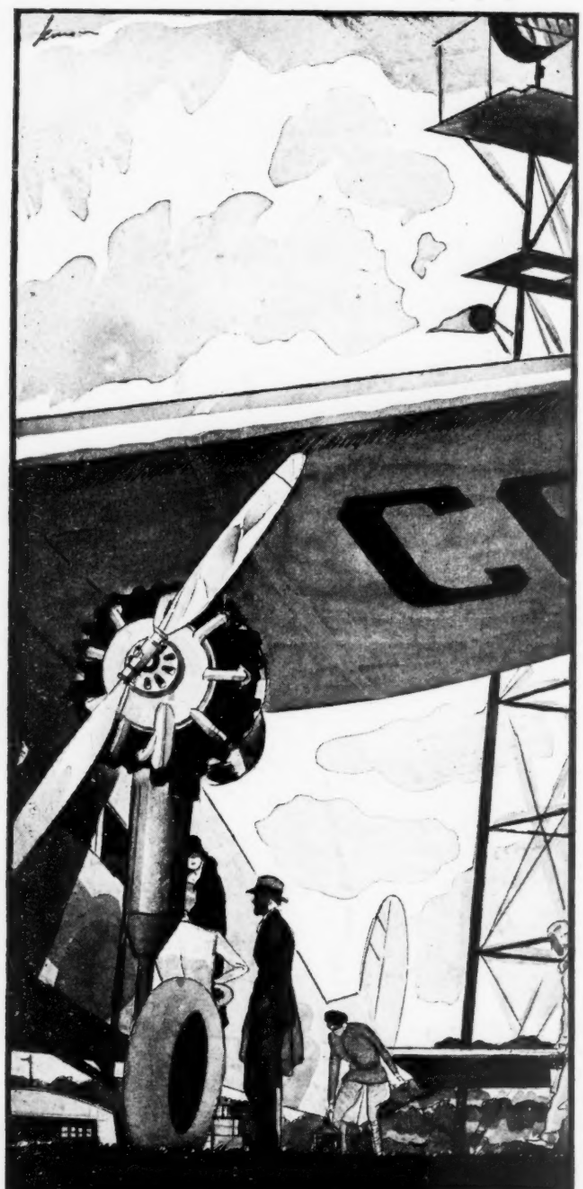

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